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Vol. 51 MARCH, 1939 No. 1

The Wilson Bulletin

Published by the

Wilson Ornithological Club

Ann Arbor, Michigan

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THE WILSON BULLETIN

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THE WILSON ORNITHOLOGICAL CLUB

Founded December 3, 1888. Named after Alexander Wilson, the first American ornithologist, and called the "Father of American Ornithology."

The officers for the current year are:

President—Margaret Morse Nice, 5708 Kenwood Ave., Chicago, Ill.

First Vice-President—Lawrence E. Hicks, Ohio State University, Columbus, O.

Second Vice-President—George Miksch Sutton, Cornell University, Ithaca, N.Y.

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Editor—Josselyn Van Tyne, University of Michigan, Ann Arbor, Mich.

Membership dues are: sustaining membership, $5.00; active membership, $2.50; associate membership, $1.50 per calendar year.

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THE WILSON BULLETIN
A QUARTERLY MAGAZINE OF ORNITHOLOGY
Published by the Wilson Ornithological Club

Vol. 51 MARCH, 1939 No. 1

A HISTORY OF THE WILSON ORNITHOLOGICAL CLUB[1]

BY R. M. STRONG

AT the annual banquet of the Wilson Ornithological Club in Chicago, two years ago, I gave an extemporaneous report of the early history of the Club. That account was based mostly on memory. This paper, on the other hand, has been prepared mainly from publications of the Club and from letters received by me from fellow members during the first eight years of the society's existence. A brief history of the Wilson Ornithological Club by Lynds Jones was published in *The Wilson Bulletin* in March, 1914.

It happened to be my custom, in those early years, to save my natural history correspondence. There were several hundred letters, and they were stored for many years in my father's house. I secured them in 1937, and I have gone through them during the past eighteen months for items of possible use in preparing this paper. Those letters which have any value as historical material have been deposited in the Wilson Club Library at Ann Arbor.

The Wilson Ornithological Club was founded by a group who were already partly organized as the Young Ornithologists' Association, and they were mostly boys. They lived in various parts of the United States from Maine to Texas, and they had become acquainted, at least in some cases, through exchange advertisements in Frank Lattin's *Oologist*. The Club was originally organized as a chapter of the Agassiz Association, a society devoted to natural history in general. Harlan H. Ballard was president of the Association.

According to my recollection, it was felt that the affiliation would be advantageous in reaching new members and that some prestige would be gained. It was not long, however, before dissatisfaction with this arrangement arose. Thus Willard N. Clute, president in 1894, in a letter dated December 8, 1890, wrote: "I do not see how the chapter can make much progress until its methods are changed very materially. First, I would like to shorten the name. Just think, of 'The Wilson Ornithological Corresponding Chapter of the Agassiz Association.'" Later, August 26, 1894, he wrote "I am sorry to see an inclination among some of our members to cut loose from the Agassiz Association. What can we gain by cutting loose? And are there not advantages to be

[1] Read at the Twenty-fourth Annual Meeting of the Wilson Ornithological Club in recognition of the Fiftieth Anniversary.

gained by an affiliation with them? President Ballard has always been very friendly toward us, and if the Wilson Chapter drops out, someone is sure to start a rival chapter in its place." Again, September 13, 1894, "Regarding the cutting loose from the Agassiz Association, I would say that the Chapter stands as the Ornithological Chapter of the whole association and to it every ornithologist in the ranks turns. If properly worked, it would bring us many members each year."

The affiliation with the Agassiz Association was not broken, however, until 1902, when the present name, The Wilson Ornithological Club, was adopted. An effort to change the name to Wilson Ornithological Society was voted down at the 1916 meeting (*Wilson Bull.*, 28, 1917: 34).

These letters of fifty years ago include references to scientific ambition and ideals. These boys wished to undertake something more than collecting and unorganized observation. To be sure, some of them were making systematic reports on bird migrations for the U.S. Biological Survey, but they had dreams of more intensive work.

Research in ornithology, up to that time, had been nearly all in morphology, physiology and taxonomy. The members of the Wilson Chapter did not have the training for either morphological or physiological work, and few had the opportunity to do taxonomic work. Furthermore, they were interested in field ornithology.

Animal behavior and ecology were not yet born, and photography was in its infancy. If an ornithologist went to a university to study, the chances were small of being assigned to a problem which had any ornithological bearings. Even life history studies had hardly begun. These boys had to strike out for themselves without scientific training and with little preceding work to guide them.

Committees were formed, some of them for subjects and others for states. Thus J. B. Richards, the first president of the young chapter, wrote, March 25, 1889: "The members are to be organized in each state so that they may better carry out our object of studying birds. You will see that the members in Wisconsin report on time and direct investigations in Wisconsin under my direction. . . . I wish you to select one or two common summer residents of Wisconsin for additional study." This scheme had already been suggested in a letter of November 24th, 1888, when plans were being made for the establishment of the society.

Still earlier, January 16, 1888, Richards had written about a plan to divide the Young Ornithologists' Association into local divisions which he proposed to call legions. Three members would be sufficient to start a legion, and the idea was to encourage cooperative research.

A letter from Lynds Jones, dated January 20, 1891, announced the following committees and their chairmen: Melological (Song), John H. Sage, Portland, Conn.; Oological, Frank L. Burns, Berwyn, Penn.; Migration, Lynds Jones, Oberlin, Ohio; General Committee, Charles A. Ely, Perrinville, New Jersey, and R. M. Strong, Wauwatosa, Wisconsin.

A melological committee had already been appointed by Richards, June 4, 1889, with S. W. Bridgham, East Providence, Rhode Island, as chairman.

Other letters from Jones and other members mention still other topics for committee study. Though some of these schemes did not materialize, there resulted some valuable publications.

With the idea of stimulating ornithological studies, Clute wrote, January 31, 1892, "With the membership we have at present, we cannot hope to do much for science. I believe offering a yearly prize—a medal for instance—for the best report by an associate member, would greatly increase their interest in the chapter."

A letter Richards dated March 15, 1889, contains the following statement concerning membership. "All the active Y.O.A. members have joined the Ornithological chapter so that what we must do now is to make our investigation a success. The Y.O.A. is kept up only as an honorary organization. It is practically changed to the Wilson Ornithological Chapter of the A.A. The Ornithological Chapter has now 32 members. The Y.O.A. has 26 enrolled."

A membership list published in the March 1889 *Curlew* contains thirty-five names, including John H. Sage, secretary of the American Ornithologists Union 1889-1917 and president of the Union 1917-20. He was one of the exceptions in age, being forty-one years old at the time. A second list in June contained sixty-two names and a third list, published a year later, contained eighty-five names, a considerable growth for one year, and by then even California was represented.

A proposal to divide the membership of the society into two groups, active and associate is found on pages 38-39 of the January 1890 number of the *Ornithologists' and Oologists' Semi-Annual.* The successor of this journal, *The Semi-Annual,* April 1891 has such a division with 19 active and 75 associate members.

The membership roll published in the March 1918 *Wilson Bulletin* contains a group of four "Honorary Members" and a year later, there appears a list of eighteen "Sustaining Members." I have been unable to find records of the legislation establishing these classes. The membership did not become large until after the establishment of regular annual meetings.

The Nebraska Ornithologists' Union became affiliated with the Wilson Ornithological Club at the annual meeting in December 1916. Proceedings and membership lists were published in *The Wilson Bulletin* for several years.

A similar affiliation with the Iowa Ornithologists' Union was approved at the 1923 meeting. Other affiliated organizations are the Kentucky and Tennessee Ornithological Societies. All four affiliated societies are listed on the front inside cover page of *The Wilson Bulletin* 1927 to 1932.

The first president was J. B. Richards of Fall River, Mass. He

served through 1889 but seemed to lose interest in the latter part of the year. His correspondence refers to plans to go to college, and his name does not appear in the 1892 list of members. He was succeeded by Lynds Jones. A vice-president was not elected until 1893, C. C. Maxfield, and the series of second vice-presidents began only six years ago. Lynds Jones was the first secretary, serving also as treasurer for two years. The writer was the first treasurer, 1892-1893. There was a business manager 1914 to 1920. Lists of past officers have been published in recent March numbers of *The Wilson Bulletin.*

The story of the official organs of publication is complicated. A tiny journal called the *Curlew* was published in October 1888 to April 1889 in seven numbers, four and five being combined. The first five numbers were only 4 x 5¾ inches in size and with a total of 48 pages. The size of the page was enlarged to 6 x 8 inches in numbers six and seven. The subscription price was twenty-five cents a year. The *Curlew* began as the official organ of the Young Ornithologists' Association. However, in the second number, November 1888, pages 23-24, there appeared an announcement of the formation of "A Corresponding Ornithological Chapter of the Agassiz Association," with conditions and expense of membership. The December number contained the constitution of the Wilson Ornithological Chapter of the Agassiz Association with the names of the president and secretary, and the Young Ornithologists Association is not mentioned. The plan of organization was stated and a program for study of the thrushes was outlined. The January-February issue contained a report of the secretary of the chapter. The covers of the March and April numbers contain the caption "Published for the Wilson Chapter A.A." The first list of members appeared in the March number, and a supplementary list appeared in the April number. The *Curlew* then died as have so many other boys' journals.

Under date of November 24, 1888, Richards wrote, "Of course I should advise you to subscribe for the *Swiss Cross,* $1.50 per year, the official organ of the A.A., but it is not necessary." In another letter, December 25, 1888, Richards said, "If anyone joins the Y.O.A. he must subscribe for the *Curlew* but if he joins the Ornithological Chapter, he will not have to subscribe."

A letter from Lynds Jones dated October 8, 1889, contained the following, "As you probably know, the publisher of the *Curlew* has suspended publication and given his right to W. H. Foote, of the *O. & O. Semi-Annual.*" This was a handsome magazine six by nine and one-half inches in size, and two numbers, comprising volume 1 had been published in 1889. The January, 1890 (vol. 2, No. 1) number devoted thirteen pages to the Wilson Chapter and another list of members was included. Seven pages were devoted to a report of the melological committee. The July (vol. 2, No .2) number had eighteen pages occupied by Wilson Chapter material, including a report of the committee on the study of the thrushes.

The next number (April 1891, vol. 3, No. 1) appeared with the name of the journal shortened to *"The Semi-Annual"* and the entire table of contents for the 45 pages was headed "Department of the Wilson Chapter A.A." Reports by the president, secretary and treasurer were included. There is another list of members, officers and committees. This was the last number of this series.

The next venture was the *Wilson Quarterly* which appeared in only two numbers (April and July 1892), edited by Lynds Jones, assisted by Willard N. Clute and published by myself. Lynds Jones transferred in 1890 from Grinnell College to Oberlin College at the end of his sophomore year. We had been considering the advantage of being in the same town for the chapter publication work, and this idea had considerable to do with my decision to go to Oberlin. I entered the junior year of the preparatory school of Oberlin College, in September 1891, graduating from the college in 1897. Jones was a member of the class of 1892. The *Wilson Quarterly* was succeeded by the *Journal* of the Wilson Ornithological Chapter of the Agassiz Association with the same editor and publisher. Two numbers (headed vol. 1 and vol. 2 respectively), of this were published in January and June 1893 with the financial difficulty that had accompanied all of these efforts. I recall taking an entire issue of one number of the *Quarterly* from the printer to my room in Oberlin, Ohio.

In the first issue of the *Journal,* President Jones announced that the Secretary, Willard N. Clute would have space in the *Popular Science News* containing Chapter news and reports, and the May 1893 number had such material including a committee report on owls, compiled by Lynds Jones. Another number for the same year, p. 151, had two paragraphs for Wilson Chapter news. During this period, space was also obtained in *The Taxidermist,* Akron, Ohio. I quote from the history published by Lynds Jones in 1914:

> Beginning with the fourth number of the first volume of the *Taxidermist* . . . space was used until its suspension with the May number, 1892. . . . Following . . . the suspension of *The Journal,* communication between the members was maintained by means of mimeographed sheets done on the writer's typewriter and the mimeograph of the Oberlin Department of Zoölogy.
>
> Beginning with February, 1894, the present series of *Bulletins* was begun by the then Secretary, William B. Caulk. These were post card size, and the three which were issued bear the dates of February, May and July, 1894. To supplement these several printed postal cards were sent out.
>
> Two reports had been prepared and it was thought best to publish them as a fitting end to the organization. The two were the "Warbler Report," issued as *Bulletin No. 4,* January 15, 1895, by the writer, and "The American Crow," as *Bulletin No. 5,* by Frank L. Burns. These were mostly financed by the writers of the reports. Instead of killing the organization, as we expected, these reports seemed to infuse it with such life that the writer of this sketch was encouraged to plan for the publication of a modest official organ to be known as *The Wilson Bulletin,* with a bi-monthly appearance. Accordingly, the publication was begun in January, 1896, as a twelve-page magazine with a printed page of 5 x 3½ inches, brevier type. This publication continued through 1899, with regularly recurring deficits which

the editor met for the good of the cause, with some occasional assistance from Mr. Burns and others.

During the several years preceding 1900 Mr. Burns had been working on an exhaustive study of the Flicker, and the editor upon a study of the songs of the warblers. Both of these papers were ready for print by the beginning of 1900, and plans were made for putting them into print. The deficits were becoming so onerous that it was decided to issue these two reports as a grand finale and disband the organization. But history repeated itself and it was found that a continuance of the publication was demanded by the membership. The editor was not able to spare the time necessary for the preparation of a bi-monthly, so it was decided to increase the size of the printed page and increase the number of pages in order to make a quarterly magazine of reasonable size. Volume 12, 1900, thus became the first of the enlarged volumes, as at present.

A letter from William B. Caulk, August 14, 1893, had in its letterhead "*The Bird*. Published in the interest of the Ornithologist and Oologist. Organ of the Wilson Ornithological Chapter of the Agassiz Association, William B. Caulk, Editor and Manager." This was apparently premature printing, and I know of no authorization of such an arrangement. Furthermore, in a letter dated July 25, 1894, the following statement occurs: "At one time, I offered to make my proposed magazine the official organ of the chapter on what I considered very reasonable terms. Some were in favor of accepting my offer and others opposed it. The opposition claimed that the chapter did not need an organ, that their reports could be issued in a more convenient form and for less money. "My magazine will soon be published but I must decline to make it the official organ of the chapter."

On August 2, 1896, Lynds Jones wrote, "The editors of the *Osprey* want us to take that paper for our official organ. As long as we can maintain one of our own, we had better do it. A regular publication gives a certain dignity to the chapter which nothing else will."

At the 1921 meeting of the club in Chicago, a proposition was presented which involved much discussion among the officers at least. I quote from page 47 of *The Wilson Bulletin* for 1921: "The president gave the gist of some correspondence which had developed with a firm specializing in the publication of scientific periodicals and which had made a tentative proposition for taking over *The Bulletin*. A letter was read from Vice-President Oberholser favoring its acceptance. Inasmuch as the contract made necessary a considerable advance in dues and certain changes in the established editorial policy, the matter was referred to the Executive Committee, with instruction to report its recommendations at the afternoon session of the second day." It is obvious that the scheme was not approved. During the years 1921-26 inclusive, the editor was assisted by an "Editorial Board."

Under date of March 13, 1891, Lynds Jones wrote "We must have a meeting somewhere, somehow. If we hope to make the organization a permanent one, we must have personal acquaintance with one another, at least with those active in work." An announcement of a meeting at Oberlin, Ohio, for December 4, 1891, with titles of papers and signed

by Lynds Jones as president was printed. I do not recall that this meeting was actually held, and I cannot find any other record of it. In *The Wilson Bulletin* for September 1914, the following appears on the first editorial page: "Remember the second annual meeting of the Wilson Ornithological Club, which will be held in Chicago, Illinois, on December 29 and 30, 1914. The first opportunity for a gathering of ornithologists in the central part of the United States was presented at the 1890 [meetings of the] American Association for the Advancement of Science held at Indianapolis. The writer attended that meeting, where he met Mr. O. Widmann, Dr. B. W. Evermann, Dr. A. W. Butler, Dr. Morris Gibbs and others. The next opportunity was offered in February, 1914, at Chicago, when we met last spring."

It will be noted that the Oberlin meeting was not mentioned, and there is no positive statement of an independent meeting of the Club at the 1890 American Association meetings, but the Club did have a real and successful meeting February 5th, 1914, and still another meeting December 29-30 in the same year, both in Chicago.

On the first editorial page of *The Wilson Bulletin* for June 1916, the following statement occurs: "As a result of negotiations begun in the early part of 1915 word has recently been received by officers of the Wilson Club that this organization has been accepted as one of the scientific societies in affiliation with the American Association for the Advancement of Science. The value and significance of this relation will be appreciated by all of our members. When meetings of the American Association occur within the territory of the Wilson Club it will be well for us to endeavor to hold our meetings in conjunction with them. The advantage at such a time and place was shown to those who attended the Columbus meeting last December. From one to two thousand scientific men coming together affords an inspiration and stimulus of the greatest value."

Meetings have been held with the A.A.A.S. each year since 1916 except for 1924, 1926, 1932, 1936 and 1938. There were no meetings in 1918 and 1933. Recent March numbers of *The Wilson Bulletin* have given lists of meetings held to date, a commendable practice.

The Wilson Club has given considerable attention to conservation activities. Many numbers of *The Wilson Bulletin* in the past twelve years mention the subject, especially in the Proceedings of Meetings.

A Committee on Endowment was appointed at the 1925 meeting. (See *Wilson Bulletin,* March, 1926:53-54.) Subsequent March numbers have contained reports on the endowment fund, in the Proceedings of Meetings.

At the 1930 meetings a library project was endorsed. The March 1931 *Bulletin,* pages 76-78, gives the report of the committee on the subject and the agreement with the University of Michigan.

Finally, some consideration should be given to the devoted and effective work of the editors of the publications of the Club and especially to

Professors Jones and Stephens. The Club would not exist now, if Professor Lynds Jones had not carried the *Bulletin* through the years from 1894 to 1914 or later at considerable financial sacrifice and with a small and not over-enthusiastic membership. Dr. Stephens, taking on the duties of editor and I believe publisher also, in 1925, has been conscientious and highly successful. There are many others who should be mentioned. Mr. Percival Coffin as treasurer 1914 to 1916 contributed greatly to the reorganization of the Club, especially from a business standpoint. Time limits do not permit other recognitions.

Loyola University School of Medicine, Chicago, Illinois.

THE WILSON ORNITHOLOGICAL CLUB OF TODAY[1]

BY OLIN SEWALL PETTINGILL, JR., *Secretary*

THE Wilson Ornithological Club of today is firmly rooted in the scene of American Science, natural history, and bird study. The past fifty years have seen its structure grow from an obscure beginning, a development which has been admirably described by Dr. Strong in the preceding paper. It is quite fitting that we should pause at this period of our existence, not only to look back over the years, but to analyze our present selves, praise and condemn ourselves, compare our present personal thoughts, feelings, and activities, and see what we wish for a bigger and better future.

In 1937 the Wilson Club submitted to its 838 members a questionnaire containing altogether 37 fact-finding questions. Each new member that joined before November 1, 1938, was given the first fourteen of these questions. Three hundred and seventy-nine questionnaires were returned, representing the cooperation of 45.2 per cent of the members.

There can be no better way to study ourselves than to delve into these questionnaires with a curiosity-loving eye and mathematical mind, for here lies as good a text of our gross anatomy, as good a cross-section of our middle structure, as can be devised. The Secretary has done this very thing. He has been aware of the statement at the head of each questionnaire which warned: "All *personal* information will be kept strictly confidential by the officers of the Wilson Ornithological Club." He has respected this statement to the very letter and has taken only general information. The questionnaires now reside in a tight bundle and a strong piece of twine holds them to secrecy. Here follows the results of the Secretary's study.

Thirty-five per cent of us dislike to reveal our full names.

Seventy-five per cent of us prefer to use initials in writing our names.

Collectively we are 40.8 years of age.

We are busy people following various occupations; only two of us are retired. Topping the list of occupations among us is the teaching profession with 24.8 per cent of us involved. Next is the business and industrial field where 16 per cent of us earn our living. Other occupations, listed in the order of their greatest following, are: Student, 13.5 per cent; biological investigator, 8.9 per cent; museum worker, 7.1 per cent; game sanctuary worker, 7.2 per cent; lawyer, physician, and nurse, 6.8 per cent. Occupations followed by less than 3 per cent of us are house wife, farmer, librarian, chemist, geologist, religious worker, writer, archeologist, entomologist, and artist.

In the field of ornithology our interests are manifold, so manifold, in fact, that they are too numerous to be listed entirely. The most widespread interest is in life history studies, for 41.1 per cent of us

[1] The second of two papers presented at the Twenty-fourth Annual Meeting in recognition of the Fiftieth Anniversary of the Wilson Ornithological Club.

have expressed enthusiasm in this work. In second place comes interest in census work among 27.9 per cent. In third place comes interest in bird-banding among 20.8 per cent. In fourth place appears the interest in bird photography among 16.9 per cent. Other outstanding interests are as follows: general interests, 11.8 per cent; ecology, 10.2 per cent; distribution, 6.8 per cent; conservation, 6.5 per cent.

We are a well-educated group of individuals. At least 18.6 per cent of us have a Ph.D. degree while 24.4 per cent possess at least one *advanced* degree of some sort. These figures only partially represent the educational background of our organization when we take into consideration that 13.5 per cent of us are in the process of getting an education. Some of us have placed our wisdom under the covers of books; in fact, 13.9 per cent of us have completely filled the pages between book covers.

Turning away from our basic questionnaires for a moment to compare the names on our membership roll with the names on the membership rolls of the American Ornithologists' Union and the Cooper Ornithological Club, we find that our interests in ornithology are so intense that between 35 and 40 per cent of us are also members of the American Ornithologists' Union and 10 per cent of us are members of the Cooper Club.

Returning to our questionnaires again, we find that 67.1 per cent of us are taking an active interest in conservation. If ornithologists are accused of not being good conservationists, let the accusers be shown this figure!

The backbone of our organization is *The Wilson Bulletin*. Without it our fifty-year-old structure would soon crumble into a mass of disorganized bird-lovers and ornithologists. What do we think of our *Bulletin?*

Ninety-five per cent of us have found interesting and instructive the articles in the *Bulletin* and have expressed our approval. Because we are an educated and a thinking group of people, we see in our *Bulletin,* as we see in other things, room for improvement. We have different ideas for its contents, we do not all agree on certain of its present policies. It is our *Bulletin;* we are, therefore, in a position to speak our minds.

In an issue of the *Bulletin* for 1900 there was published "A Monograph on the Flicker" by Frank L. Burns. The entire issue from cover to cover, 82 pages in all, was devoted to this article. Later, in 1911, another issue (two numbers combined) was devoted to a similar monograph on the Broad-Winged Hawk by the same author. These two articles were some of the first comprehensive life histories of birds ever published and were the first articles ever to occupy *all* the pages of a single issue of an American ornithological journal. In 1937 this custom was revived when the September issue of the *Bulletin* contained "A Life History of the Oven-bird" by H. W. Hann. These *Bulletins* were without the general notes, the reviews, and the shorter articles more quickly

read. Asked whether it was desirable to have one number of the *Bulletin* devoted entirely to an article monographic in scope once every year, every other year, or at all, the members replied as follows: 57.8 per cent preferred it once every year; 13.9 per cent preferred it every two years; 13.5 did not prefer it at all; 7.5 per cent were indifferent while 7.1 per cent qualified their answers by saying "occasionally."

Each year it is customary to publish the membership roll. Approximately 14 pages are involved. Thus the roll is published at the expense of other articles that might be published. Naturally considerable expense is involved and space is used that might be devoted to the publication of other articles, general notes, etc. Yet the roll is useful in several respects: (1) New members find their names promptly incorporated in the organization and feel that they are at once a part of the organization; (2) an up-to-date address list is provided for intercommunication; (3) the roll serves as a convenient check-list for the officers, committees, and others. Faced with the question "In the future do you wish to have the membership roll published every year, every other year, every three years?" the members replied as follows: 20.6 per cent said "every year"; 37.5 per cent said "every other year"; 34.9 per cent said "every three years"; while 5.2 per cent were indifferent. As many as 0.7 per cent volunteered the statement that they preferred not to have the roll published at all. Studying these replies further we find that 72.4 per cent are against the publication of the membership rolls every year and are thus ***not*** in favor of our present custom.

The Wilson Bulletin, like many contemporary American ornithological journals, carries reviews of literature. Here, as in *The Auk, Bird-Banding,* and *Bird-Lore,* there is much duplication of reviewed material. Our *Bulletin* is not sufficiently large to cover the literature in the thorough fashion of *The Auk* and *Bird-Banding* and has never intended or pretended to do so. Asked if we prefer additional reviews, 65.4 per cent of the members said "Yes"; 25.9 per cent said "No"; while 8.6 per cent were indifferent. These replies are indicative of one of two things—either the majority of us enjoy reading duplicated reviews in the ornithological journals and looking for possible diversity of editorial opinion, or the majority of us depend upon the *Bulletin* for reviews and have little occasion to refer to other journals.

Because *The Wilson Bulletin* is used primarily by middle westerners and is, therefore, a local journal, the following question was asked: "Would you be interested in having foreign literature reviewed?" The vote was close indeed. Forty-two and one-tenth per cent said "Yes"; 45.8 per cent said "No"; and 12 per cent were indifferent.

Every natural history journal of any importance contains sections captioned "General Notes." These are items easily and quickly read; and they are of such diversified character, that each member is almost certain to find one note of great interest. The question, "Do you find the general notes of sufficient interest to warrant their continuation?"

received an affirmative answer in 92.4 per cent of the members—a decisive answer indeed.

The members were asked to make any suggestions regarding new sections in the *Bulletin* and particularly to give their opinion of a section on conservation. This question received an interesting and instructive group of replies, though many of them were decidedly in disagreement.

Easily fifty per cent favored a section on conservation but the qualifications with the replies were so varied that they cannot be compiled. However, we may mention a few of them. Here are some favorable replies in brief: Discussion of conservation all right if confined to information, not propaganda; give a concise summary of conservational activities; give only a yearly review of conservation; give information concerning conservational legislation, particularly as applied to birds; show spirit of cooperation rather than criticism in conservational matters; confine conservation to editorial remarks and general notes, but do not have section on conservation; let utterances on conservation be rational, for remember that conservation has made asses of some conservational organizations; so much conservational matter is published in a juvenile fashion that it would be a joy to see conservation treated in a scientific magazine; have an annual water-fowl census section. Another twenty-five per cent were opposed to a section on conservation and objected to the *Bulletin* taking any step in conservational work. The following replies were typical: Enough publications on conservation; don't be like *Bird-Lore;* leave conservation to journals that specialize in it; conservation is apt to be dull so stay away from it; stress ornithology always; too much conservation already; *Bird-Lore* covers the ground sufficiently; a mistake to enter the field of conservation for you will incur hatred; let the *Bulletin* print studies of birds which may be used in conservation but leave conservation talk to others; a conservation section all right if you can get an outstanding authority to handle it.

A few other sections were suggested. Samples are: reminiscences of old times; experiences of members; section of letters; photography section; migration section; experimental ornithology section; biographical section; activities of ornithologists; ornithological projects being undertaken here and there.

Another question put to members was "What kind of articles would you prefer?" Members were also urged to criticize the *Bulletin.* Several members answered by urging more truly scientific articles; others urged more popular articles. The urge for scientific articles, however, was greater than the urge for popular articles. Naturally members asked for more articles in the fields of ornithology in which they were especially interested. If they liked life history work they wanted more articles on that subject. A number of members asked to have the *Bulletin* refrain from publishing local lists. Here are some more comments in brief: let's not copy *The Auk;* keep between *The Auk* and *Bird-Lore;*

would like more live material instead of reviews of past; heavier editorial blue pencil; more original material; Dr. Stephens is doing a fine job; more historical notes; more articles in systematic ornithology; should still read the *Bulletin* if it came disguised as a tabloid newspaper; more careful selection of general notes.

Altogether 91.3 per cent found the general appearance and format of the *Bulletin* attractive. (This reply was solicited before the cover with the Wilson's Warbler drawing was changed.) Only 2.6 per cent did not like the format; two disapproved of the cover. Numerous comments were volunteered thus: paper too shiny; type could be more attractively spaced; let an advertising agency draw a more attractive cover design; reprints to authors gratis; start articles at top of page so that reprints do not begin half way down the first page; margins too wide, thus wasting space for type.

Twenty-one members reported complete sets of the *Bulletin* in their libraries.

Once a year the Wilson Club functions as a true organization when it holds its Annual Meetings. Here lies the source of the structure's activity; here the Club becomes an organization and not a subscription list.

The present Annual Meeting is only our twenty-fourth although our organization is a half-century old. Unlike the A.O.U., which has met annually since its inception and has had regular attendance over a long period of years, the Wilson Club has met irregularly and has only recently begun to receive a following at its Annual Meetings. Actually 18.4 per cent of us have attended one meeting while an additional 13.9 per cent have attended two or more meetings.

The business sessions and the reading of papers are accepted customs on the occasion of Annual Meetings. Other activities are sometimes of equal importance for they provide both amusement and instruction to members and visitors during the few hours when the meeting is not in session.

The members were asked if they would like an exhibit of photographs, an exhibit of artistic work (paintings, drawings, etchings), or a photograph contest in which various members would enter a limited number of photographs and an award would be given. The suggestion of an art exhibit was liked by 59.3 per cent of the members; the photograph exhibit by 59.7 per cent; the photograph contest by 43.7 per cent. Of the three suggestions, 28.5 per cent preferred the art exhibit while 21 per cent preferred the photograph exhibit.

The members were asked to suggest other activities and the replies were of great interest. Some were as follows: life history photograph exhibit; symposia every year; display of bird-banding apparatus; special exhibits such as food habits of raptorial birds; symposium on game management; pictorial history of the W.O.C.; bird-skin guessing contest; hold the Annual Meeting with the A.O.U. when the latter con-

venes in the Mississippi Valley; exhibit of valuable ornithological books; field trips; have local bird organizations meet with the Club.

The Wilson Club has followed no traditional time of meeting, save that when the American Association for the Advancement of Science holds its Christmas Meetings in the Mid-west, we meet with them. Nevertheless we have met most often at Christmas and Thanksgiving time. Asked which would be preferred, the Friday and Saturday following Thanksgiving or two consecutive days between Christmas and New Year's Day, 21.4 per cent said Thanksgiving; 31.5 per cent said Christmas. A large portion of the membership, 46.2 per cent, were indifferent, probably not desiring to attend a meeting. Nearly every other time of the year was suggested. Asked whether or not our meeting with the A.A.A.S. was an inducement for attendance, 35.7 per cent said "No" and 33 per cent said "Yes" while 30.4 per cent were indifferent.

In conclusion the Secretary will present his conception of the Wilson Ornithological Club of today using the data already given you and injecting a little of his own opinion.

We of the Wilson Ornithological Club are 40 years of age and in the prime of life.

We are interested in field ornithology liking especially life-history studies, census-work, bird-banding and bird photography.

Because a large portion of us are school teachers we have by necessity become well-educated, having degrees of many sorts.

We are Midwesterners. Our interest in birds is somewhat localized. Less than half of us are members of the American Ornithologists' Union; less than a quarter of us like reviews of foreign literature.

Of our *Bulletin* we heartily approve. Over half of us would like to see one number of the *Bulletin* each year devoted exclusively to a monograph.

We hope that the membership roll will not be published every year. We would like more reviews of literature. We thoroughly enjoy the general notes. We should like to see the *Bulletin* make some move in the direction of conservation.

The articles published in the *Bulletin* during recent years seem to be satisfactory and well-read by all of us. Some of us would like to see, however, a reduction in the number of local lists. Since many of us have expressed a strong interest in life history work, census work, and bird-banding, it would seem that the majority of articles should be devoted to these spheres of interest.

At our Annual Meetings we would like exhibits, particularly art and photograph exhibits, and perhaps an occasional photographic contest.

A large portion of us are indifferent as to the time of the Annual Meeting. Of those who have expressed preferences for either a Thanksgiving or Christmas meeting, more have chosen the Christmas meeting.

CARLETON COLLEGE, NORTHFIELD, MINNESOTA.

NOTES ON THE NESTING OF THE CLAY-COLORED SPARROW

BY LAWRENCE H. WALKINSHAW

IN Crawford County, Michigan, immediately west of Lovells, is an area of rolling brushy prairie, swept only a few years ago by a great forest fire. It now is a favorite habitat for many prairie birds, probably the most abundant of which is the Clay-colored Sparrow (*Spizella pallida*). While visiting Lovells during late May, 1932 I observed this species for several days and a conservative estimate of the number observed on one day (May 29), when much time was spent on the area, was 25, most of which were singing males. On June 24 I searched unsuccessfully for nests, but found one young, only a few days out of the nest.

While crossing the Upper Peninsula of Michigan during late June, 1933 I spent the night of the twenty-seventh south of the town of Sidnaw, in Houghton County near the junction of Houghton, Baraga and Iron counties. Here also, the Clay-colored Sparrow was abundant, but I found no nests.

During June, 1934 and 1935 I found the species rather abundant in certain areas in Schoolcraft County, both near Seney and at Blaney, where Dr. K. Christofferson had several singing males only a short distance from his cottage on T-Lake. We made an extensive search but our only success was finding several of the past season's nests in some low, dense bushes. On June 27, 1935, Dr. Christofferson found a nest with five eggs which he sent to the University of Michigan Museum of Zoology.

July 4, 1937 found me back on the Crawford County prairies, searching for nests of the Clay-colored Sparrow. This time I found one nest under construction, five with eggs, two with young, and several empty nests probably belonging to this species. On July 12 I discovered an empty nest apparently of this species in Oscoda County along highway M-72 north and east of Fairview where there were several singing males. I also heard several males along the road west of Harrisville, Alcona County on the same day. Besides these records, I caught a young Clay-colored Sparrow still unable to fly at Lovells on August 1.

The usual nesting site was well above the ground in some small shrub or tree. Six were in maples, two in oaks, one in a shad bush, and the other in a small haw. The nests in small haws were much lower than those in the other shrubs, with the single exception of one found very close to the ground in a shad bush. Another fact noted was that the shrubs containing the nests were usually located, not on top of a hill or directly in a valley, but rather on the slope of a hill. Very few of the shrubs or trees on the area were more than five or six feet high (150 to 180 cm.) and the nests were usually in the densest por-

tion, averaging 50 cm. above ground (27 to 75 cm.) Located in a natural cupping of the vegetation or in a crotch of the branches, the nesting material was merely placed there and the structure raised from this base. With one exception, this proved very substantial, resisting both wind and storm. Only nest No. 8 was poorly balanced and tipped badly the day the last egg was laid. Nest No. 3 was very conspicuous, because of the use of many long stems of grass in the base, ten or twelve of which measured 35 to 58.2 cm. How the bird manipulated these into the nest is hard to imagine. Above these, as in the usual nest, were shorter grasses worked into a circular formation, and finally lined with the finer tops of the same type of grass. There were 384 pieces of grass in nest No. 3. The finer pieces in the lining were from 3 and 4 cm. up to 15 cm. in length. In nest No. 1 there were a very few horse hairs but none of the others inspected contained any. Three nests were weighed, averaging 6 grams (4.3, 6.6 and 7.3 grams) while measurements were taken on eight. The outside dimensions at the top were from 80 to 130 mm., averaging 101 mm. The average outside depth was 68.5 mm., varying from 58 to 90 mm. The inside cup was usually a little longer one way and the measurements at the top were very uniform, usually 45 x 50 mm. averaging for the eight nests, 45.6 x 49.3 mm. and 37.5 mm. deep. The latter measurement varied from 30 to 45 mm.

TABLE 1

SUMMARY OF CRAWFORD COUNTY NESTS OF 1937

	Date Found	Contents	Eggs Laid	Young Hatched	Young Left Nest
1.	July 4	4 eggs	Fresh	July 12 (3) July 13 (1)	July 21 (4)
2.	July 7	Nest under construction; deserted			
3.	July 7	2 young		July 6–7*	July 15 or 16
4.	July 7	3 eggs	July 8–4th	July 18 (3) July 19 (1)	July 26 or 27
5.	July 9	2 eggs	Fresh	Destroyed	
6.	July 9	Empty			Young being fed near nest
7.	July 11	4 eggs	Not known	July 13 (3) July 14 (1)	Uncertain
8.	July 10	0 eggs Nest complete	July 11–14	July 24 (2) July 25 (1) July 26 (1)	Nest empty August 1
9.	Aug. 1	4 young	Not known	Young 4–5 days old	Not known
10.	Aug. 1	1 young just out of nest			July 31*

* Estimated.

The fine grass used was found over the entire area, so the birds must have had little trouble in locating nesting material. Six Field Sparrow (*Spizella pusilla*) nests found on the area differed little from the nests of the Clay-colored Sparrow in appearance except as regards the linings, the former using rootlets and much more hair. Confirmation

Fig. 1. Clay-colored Sparrow in characteristic habitat, Lovells

Fig. 2. Adult at nest No. 1, July 13, 1937, Lovells

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of the owner of occupied nests was made by watching her return to feed the young or by identifying the bird flushed from the nest.

If disturbed when incubating, the female usually moved off into the nearby cover without scolding. However, as soon as the young were a day or two old she would, whenever flushed, start a persistent chipping from some nearby perch and continue until I left the vicinity. The male, as a rule, paid little attention to a human intruder, very seldom even approaching, until after the young were several days old. After that he would come to some distant spot whence, without scolding, he would watch the intruder. On many occasions the male continued singing only a short distance away while I inspected the nest. The male's persistent singing was the only indication of "territory" observance which I noted. When I captured a young bird yet unable to fly one of the parents, presumably the female, flew down to the ground, dragging her wings and advancing slowly, chipping constantly. She continued this as long as the young bird uttered a distress note. The other parent was not seen at any time during the entire procedure which lasted several minutes while I weighed, measured, banded, and photographed the young bird.

The eggs of the Clay-colored Sparrow differed very little from those of the Chipping Sparrow. The spots, forming a wreath around the larger end of the egg, varied in different sets, those in some being much coarser and very dark, while others had fine reddish-brown spots. The ground color in all eggs observed was a uniform greenish-blue, some sets being slightly darker than others. The eggs of a single set usually varied but little.

Measurements of 18 eggs averaged 18.05 x 13.25 mm. The largest egg measured 20 x 14 mm. and the smallest 17 x 12.5 mm. The average weight of 16 fresh eggs was 1.53 grams, while at hatching time this average was 1.3 grams, a loss of .23 grams, or 15.03 per cent. The average weight of newly hatched young was 1.2 grams.

The number of eggs in every complete set found was four. T. S. Roberts (1932:416) records sets "averaging 3–4, rarely 5."

From 22 eggs in 6 nests, 20 hatched, only one nest being destroyed. Of these 20 young at least 15 (possibly 18) left the nest safely. An even better record was established by the 6 neighboring Field Sparrow nests. In every nest of this latter species found, all of the eggs hatched and the young fledged safely. There must have been very few predators in the area. A few Crows and Blue Jays were seen flying over and a house cat was observed at Lovells, searching through the grass along the roadside. The area in question was five miles in length and two or more miles wide. From one position as many as six to ten Clay-colored Sparrows could be heard singing at one time. Since two, possibly more, broods are reared during a season, one can imagine how many young must be fledged there each year.

The laying of the eggs was followed at nest No. 8, where one egg

was laid each morning during the very early hours. Nest No. 4, contained 3 eggs when found and a fourth the following morning. Coues, (1874:150), in his excellent description of the nesting of this species, describes similarly the laying of the eggs.

Since the males sang persistently near the nests in all cases, it is my belief that the female did all of the incubating but I have not proof of this. However, on two occasions at nest 1, I did find the male brooding the young at noon time when they were one and two days old. The female soon arrived carrying food, which she immediately swallowed on spying me and started scolding as she previously had when I found her at the nest. The male, when flushed, did little or no scolding, merely watching me from some nearby shrub. Incubation started, on two occasions mentioned above, the night previous to the laying of the last egg. The female, while incubating, was very inconspicuous, resting low on the nest. The incubation period at nest No. 4 was 11 days while at nest No. 8 it was 11½ days. This is quite similar to that of the Chipping Sparrow (Densmore in Roberts, 1932:413–414) and (Walkinshaw, 1934:304).

At hatching the young were blind and naked, adorned only with a few dark gray neossoptiles on the frontal, occipital, scapular, and sacral regions. The skin was flesh colored on body and legs and that covering the eye appeared bluish-black. The food brought to these very small individuals was small tender insects, some of which were barely discernible to the eye two or three feet away. Later much larger insects were fed the young. They developed rapidly and left the nest at the age of eight or nine days. The young at the age of leaving the nest already showed the characteristic face markings and had a buffy central crown stripe. One young bird when it left the nest weighed 10.3 grams. It had the primaries unsheathed about 10 mm. and the tail 4 mm. It was very active, chipping rapidly when first found and later calling for food. The returning parent came low through the brush to the call of the young. Finding the young in my hands, the old bird swallowed the food and feigned injury by fluttering along the ground.

At the nest both parents fed the young, the female seeming to do most of the work. While I was photographing at nest No. 1 the male often brought food to the brooding female but she always left the nest to receive it.

The song of the Clay-colored Sparrow is a very unimpressive "*scree-scree.*" Sometimes only one of these notes is given; again there are two or more, up to six. However, each individual male was found to give nearly the same number of notes. Individuals did not vary more than one note either way. During the height of the nesting season the males sang all day but by August they were less persistent and often there were no songs during the heat of the day. The rate of singing of one male at 8:25 A.M. on July 9, 1937 was 8,8,8,9,7,9, and 7 times per minute during consecutive minutes. This seemed to be an average rate

Fig. 3. Nest No. 8 removed from site for photographing

Fig. 4. Parent feeding young, July 13, 1937, Lovells

of singing males at that season. The particular male recorded was uttering the "two-buzz" song and males giving songs of three or more parts sang a little less frequently. The alarm note was a sharp *"chip,"* seldom uttered until the young were a few days old. After that it was rapidly repeated whenever they were disturbed. Twice alarm notes were heard which resembled those of the White-throated Sparrow (*Zonotrichia albicollis*). Young birds out of the nest gave a low *"z–z–z–z"* when disturbed.

Summary

The Clay-colored Sparrow is a common nesting bird in parts of Michigan, especially in the northern section of the Lower Peninsula. It is also found in much of the Upper Peninsula where the habitat is suitable. The nests are built in shrubs and small trees and average 50 cm. above the ground. In my experience the eggs were laid during the early morning hours, one each morning until the set was complete. Four was the average number of eggs. The eggs averaged 18.05 x 13.25 mm. in length and width and 1.53 grams in weight (1.3 grams just before hatching. The incubation period was 11 to 11½ days.

The young at hatching time averaged in weight 1.2 grams and one young bird at the time of leaving the nest weighed 10.3 grams. Both parents aided in feeding and brooding the young but only the female incubated the eggs. The nestling period was 8 or 9 days.

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THE COMPARATIVE ABILITY OF THE BOB-WHITE AND THE RING-NECKED PHEASANT TO WITHSTAND COLD AND HUNGER[1]

BY PAUL L. ERRINGTON

THE native Bob-white (*Colinus virginianus*) and the introduced Ring-necked Pheasant (*Phasianus colchicus torquatus*) may both, on occasion, suffer severe winter mortality over much of their common range in north-central United States. Their habitats often overlap, although the Pheasant has a greater cruising radius and an ability to live in a more open type of country than the Bob-white. In given localities they also live upon much the same kinds of winter foods.

The scope of this paper is not intended to cover the ecological adjustments of Pheasants or of Bob-whites to their winter environment so much as the manifest effects of cold and malnutrition upon these birds under extreme conditions.

Data upon which this paper is based were, for the most part, obtained incidentally, in connection with a number of field study and experimental projects in Iowa and Wisconsin, chiefly between 1929 and 1934. Certain apparent hiatuses attributable to the incidental origin of the data would doubtless yield to specifically directed experimentation, but the latter I am not in a position to carry on and probably will not be, at least for some years to come. In the meantime, it may be of biological interest and possible value to wildlife management to summarize the data already available on the comparative hardiness of Bob-whites and Pheasants.

Experiments with 40 captive Bob-whites at Madison, Wisconsin, in 1930 and 1931, supported on the whole the conclusion arrived at from field studies that few of the foods commonly eaten are substantial enough to serve as winter staples (Errington, 1931*a*; 1933; 1936*b*; Errington and Hamerstrom, 1936, pp. 381–82). Bob-white populations thrived during cold weather only when they had access to corn, soybeans, achenes of lesser ragweed (*Ambrosia artemisiifolia*), and other high quality staples; when compelled by a shortage of these to feed heavily upon fleshy fruits, chaffy or woody material and similar foods of less sustentative types, the birds were able to maintain neither weight nor strength and were especially subject to mortality during periods of low temperatures.

Bob-white winter mortality from starvation and cold may be almost cataclysmic when acute food crises result through deep and persistent snows. Losses as high as 80 per cent of a wintering population in two weeks have been recorded (Errington, 1933), and there is historical evidence that great storms have practically depopulated wide

[1] Journal Paper No. J-262 of the Iowa Agricultural Experiment Station, Ames, Iowa. Project No. 329.

areas of this species in the past, though not necessarily through hunger and cold alone (Leopold, 1931; 1933; 1937).

The experiments with Pheasants were conducted at Lansing, Iowa, from January to April, 1933, through the coöperation of the Iowa Fish and Game Commission. The Commission made available 100 live Pheasants from the stock of the recently discontinued State Game Farm and contributed quarters and the services of W. E. Albert, Jr., for the care of the birds and the handling of the experimental routine. Experiments were planned not only to approximate emergency conditions but also to reduce the variables as much as possible to those of temperature and food (Errington, 1937).

U. S. Weather Bureau records were the source of the air temperature data for the Bob-white experiments at Madison, Wisconsin. Official records were not obtainable from Lansing, Iowa, so Weather Bureau records from Decorah were used for the Pheasant experiments. Unofficial readings made by Albert at Lansing, however, did not differ a great deal from the Decorah records.

Bob-whites and Pheasants alike were quartered in partly open, unheated pens in which the birds were exposed to natural temperature changes to about the same degree as free-living birds resorting to the cover types ordinarily used in their north-central states environment. Unquestionably, there were temperature differences in the shelter of the pens that were not reflected exactly by thermometers elsewhere, but probably not significantly greater than the differences to be expected between air temperatures and the temperatures of roosting places in marshy or grassy vegetation or in other retreats that the birds may happen to frequent in the wild.

Relation of Body Weight to Resistance to Cold

A. Bob-white.—Native northern Bob-whites, if well fed and in prime condition, usually withstand most low temperatures occurring within their range. Many of my field notes deal with populations surviving air temperatures lower than 15° below zero (F.). These notes show such extremes in temperature of 24°, 27°, and 30° below zero, with a minimum of 35° below.

It is true that Bob-white coveys reduce their activities or even cease moving for hours at a stretch during exceptionally cold weather but at these times they do not seem to prefer especially dense cover. Again and again, they have been observed bunched up for either night roosting or daylight resting in open cornfields or in cover more adapted to give them concealment than warmth.

Although nearly every unusually cold wave leaves an aftermath of Bob-whites dead on roosts, the intact carcasses that I have examined of birds thus killed were mostly those of individuals in subnormal physical condition from wounds, disease, or hunger. The sole record I, per-

sonally, have of well-conditioned Bob-whites freezing has to with a covey that roosted on a steaming manure pile and was flushed off into the sub-zero air. One bird of this covey was retrieved dead in fine flesh at 179 grams (practically full weight for this specimen), but the moisture from the steam had permeated its plumage and caused it to chill and die at a temperature it doubtless would have withstood had its plumage been dry (Errington, 1933).

On the other hand, the killing winter of 1935-36 demonstrated that Bob-whites may succumb to intense and continued cold even when in apparently good condition, fat and well fed. Exposure to blizzard winds and partial encasement of their heads in ice and snow evidently can reduce to a state of helpfulness otherwise normal birds (Scott, 1937). Leopold (1937) gives the results of examinations of a number of normal-weight Wisconsin birds found dead or helpless in the field and refers to 14 of a weather-killed covey found by Douglas Wade, one of his students. The members of this covey had a coating of ice under their wings, which, if suggesting wet plumage in cold weather, may have been responsible for their deaths through chilling as in the case of the birds roosting on the steaming manure pile. Perhaps most baffling of the questions raised by Leopold's paper are those pertaining to Bob-white individuals picked up dead or weak without anything perceptibly wrong with them. One of these weighed 250 grams (with a full crop of corn), the heaviest weight for this species that has come to my notice. Leopold recognized the possibility of undetected disease entering into the equation, a possibility supported by the fact that the 250-gram bird was caught by hand after a flight of 10 feet on December 28, 1935, before there had been any excessively cold weather.

Wade's 14 dead birds were included in the series of 40 weather-killed Bob-whites examined by Leopold and his students in 1935–36, but, exclusive of this covey, mention is made in the same publication of at least 7 of the birds either dying at weights exceeding 200 grams or "fat, with food in the crop." A total of 60 per cent of the 40 weather-killed birds exceeded 150 grams in weight, contrasted with a total of only 2 or 6.1 per cent of 33 dead birds previously examined by me in much the same area during the winters of 1929-30, 1930-31, and 1931-32. Of the 2 Bob-whites I recorded as dying in cold weather at exceptionally high weights, one was the steam-wet individual and the other was a large-frame bird reduced to 158 grams. The weights are those only of carcasses found intact before scavengers had eaten any part of them. Night-scattering of coveys during blizzards is sometimes attended by severe mortality (Errington, 1933, p. 14; Wade, 1938).

It may be seen that my Wisconsin data on Bob-white dying weights seemingly are less complicated by the unknowns and variables associated with the winter of 1935-36, a season of historically unprecedented severity and one perhaps atypical in other ways. We may then go on with a presentation of data in hand on relationship of temperature to

dying weights for less extraordinary winters and include pertinent data from Iowa and Missouri, as well.

Leopold (1931, p. 58) gives the weights of 6 Bob-whites picked up dead in southwestern Missouri in January, 1930, during a cold wave in which temperatures had dropped to about 20° below zero (F.), and I examined 7 more sent in by local game wardens. These 13 birds had died at an average of 124 grams or 67.8 per cent of the 183-gram average which Leopold (unpublished) found for normal Missouri Bob-whites in winter.

Five birds examined from south-central Wisconsin died during a March, 1932, cold snap with a minimum temperature of 4° below zero at an average of 129 grams or 65.2 per cent of the 196.5 grams average obtained from the weighing of 77 prime, early winter and mid-winter Bob-whites from the same general area. Four others died at an average of 110 grams or 55.6 per cent full average weight during a February, 1930 period when the minimum temperatures varied from 10° to 25°; at corresponding temperatures, 5 specimens alive but so weak as to be barely able to fly averaged 134 grams or 68 per cent full average weight.

Two Wisconsin birds, confined for experiments and reduced practically to the verge of death, were force-fed and brought back to recovery from 119 grams and 104 grams, or 58 per cent and 50 per cent of their known full weights. These withstood the air temperature of 5° on the first night after relief, but had more food in their stomachs than most starvation victims are likely to have when they are down to this stage. It is improbable that they would have survived without force-feeding.

Eighteen captive birds of a Wisconsin experimental lot died from January to April, 1931, on days for which the minimum air temperatures averaged 32° and at a weight average of 109 grams or 56.5 per cent of their original weight average of 193 grams. Twelve captive Bob-whites at Lansing, Iowa, died during the 1932-33 experiments at an average weight of 108 grams and at minimum temperatures averaging 21°. Weights of 287 southern Iowa Bob-whites taken by hunters in November and December, 1933, averaged 6¾ ounces or 191 grams (Schuenke, 1933), which would suggest that the Lansing captives died at 54.5 per cent to 56.5 per cent of their probable normal weights.

At the bottom of the scale of resistance were two Wisconsin birds still lively under experimental conditions at an average of 111 grams or 56.8 per cent full weight during mild weather but both dying from an abrupt autumn drop in temperature from 42° to 28°. Leopold (1937) makes some interesting statements bearing upon this point:

"After the return of mild weather in March, some birds of surprisingly low weight were found, 83, 90, 92, 102 grams. All these melted out of drifts, and hence had lost some weight by decomposition. The last three at least had been imprisoned alive in the snow, and thus

kept warm while starving; hence their weights are not representative of ordinary weather-killing. Another 95-gram bird, however, was picked up January 28 near a feeder. Death had apparently (but not surely) been recent. Survival of a free-ranging bird to such a low weight in cold weather is not explicable. It is usually believed that quail survive at very low weights only in warm weather."

I might observe parenthetically that my notes record one Wisconsin Bob-white weighing only 148 grams, collected on February 6, 1931, a fat and, to appearances, full weight bird but one that seemed naturally under-sized. Another bird taken on March 15, 1930, was in similarly good condition and weighed 161 grams. Either of these reduced to 60 per cent of their normal weights would go well below 100 grams.

A large number of starved birds were found in the field after they had been partially eaten by predators or scavengers, but the approximate dying weights of many could be ascertained from their breast profiles (see Errington, 1931a, or Leopold, 1933, p. 263); and these continue to support the concept of a progressive increase in susceptibility to cold with decrease in weight.

Expressed graphically, the data on dying weights and minimum air temperatures show two conspicuous cold resistance levels for winter Bob-whites. At minimum air temperatures of 10° to 32°, the birds seem to die at averages between 55 per cent and 57 per cent of their full weights; then, there is a lack of data on dying weights between 10° above zero and 4° below; finally, from 4° below to 20° below zero, the curve apparently levels off, and the birds die at averages between 65 per cent and 68 per cent of their full weights.

Kendeigh (1934, p. 339) concludes, on the basis of experiments with a migratory passerine bird, the House Wren (*Troglodytes aedon*), that "the critical aspect of low air temperature consists not in the absolute degree of low temperature itself, but low temperature combined with a period of time in which the bird must remain without food." He states further: "In the case of some of the larger birds of greater weight and correspondingly greater food reserves in the body, the critical role of night temperature and hours of darkness may become effective only if accumulative over a long period. If a bird is able during the daytime to assimilate only a part of the equivalent total energy that it loses at night, there will finally come a time when its temperature tolerance entirely breaks down, which results in death."

In general, it seems that healthy adult northern Bob-whites may be reduced to about 80 per cent of their full weights without danger of freezing to death under ordinary circumstances, although at this weight they have little reserve and must have regular access to substantial food. Reduction below 75 per cent begins to bring birds within the realm of danger, and birds down to 65 per cent are usually in a precarious way. At the latter stage, they may be expected to survive only if lucky, being unable to escape even clumsy enemies and dying

during moderate cold snaps. From 65 per cent on down to a known minimum of 45.2 per cent of full weight, the birds may be so delicately poised between life and death that they stand practically no chance of saving themselves or of being saved under natural winter conditions in north-central states.

Bob-whites of both sexes died from starvation at about the same weights in the course of the investigations: 27 cocks at an average of 113 grams and 24 hens at an average of 113.7 grams (Errington, 1936a). Forty-six of the birds in my series of 77 full winter weight individuals were cocks and averaged 196.8 grams, whereas the 31 hens averaged 196.1 grams.

B. Ring-necked Pheasant.—I have encountered scant evidence of Pheasants actually starving in communities where much land is under cultivation. Green and Beed (1936) found that, even during 1935-36 when the wintering loss on the principal area under observation in northern Iowa amounted to 250 or 62.5 per cent of a population of 400 birds, the death of only one of these was attributed to starvation. One hundred thirty-one birds, or 32.75 per cent of the population, were found dead, having died apparently as a result of choking from accumulation of ice about mouth and nostrils or from freezing or from choking and freezing combined. Exposed to very cold, snow-laden winds, Pheasants in unprotected places died with their feathers filled with ice and snow, and in some instances live birds were found "so heavily covered with ice and snow that they could not fly"; other birds with eyes covered with ice were taken in by farmers and were liberated, apparently unharmed, after the ice had melted off. The dead birds found were in good flesh, averaging 3 lbs. (1361 grams) per cock and 2 lbs. (907 grams) per hen.

Starvation of free-living Pheasants in north-central states seems more likely to occur in the northern-most parts of occupied range where acreages in cultivated crops are small and scattered. Most of the seemingly reliable second-hand information I have on Pheasants starving comes from northeastern and central Wisconsin and central and north-central Minnesota where not only is deep snow characteristic of winter environment but where there may be little suitable winter food for these birds when snow is light or absent. Beed (1938), however, reported an instance of severe Pheasant losses from starvation and exposure in northeastern South Dakota during the winter of 1936-37; of 126 Pheasants found dead and examined, the stomachs of 104 "contained no food whatever."

If corn or similarly high grade winter food exists in their habitats at all, the Pheasants show far more aptitude for getting it than do the Bob-whites, for the superior strength of the larger birds permits them to dig out food covered with snow or partially imbedded in ice or frozen ground. Moreover, if they do have to go hungry they can

withstand cold that underweight Bob-whites would find unendurable, as is illustrated by the following experimental data.

The initial weights of the game farm birds corresponded fairly well with the weights of Iowa Pheasants shot by hunters in Kossuth County (which has about the same latitude as Lansing) during open seasons. Forty-three wild cocks killed and weighed November 18, 1932, and 25 killed and weighed November 10, 1933, averaged 1252[2] grams and 1273 grams, respectively. Eighteen of the Lansing cocks, fully fleshed but of game farm origin, averaged 1132 grams in December, 1932. Thirteen wild hens killed November 18, 1932, averaged 932 grams, compared with the December average of 877 grams for 46 propagated hens.

The heavier cock Pheasants appeared to show somewhat more resistance to cold and hunger than the hens used in the experiments (Errington, 1936a), but the difference probably was not enough to introduce a significant variable into the data.

Initial and dying weights were secured for 32 Pheasants that died in the course of the experiments at Lansing. Of these 32 birds, 19 died in mild weather at an average minimum air temperature of 20.5° (F.). Minimum air temperatures for the two coldest nights were 4° above and 9° below zero. The average dying weight of the 19 birds was 504 grams or 55.1 per cent of their initial weight average of 914 grams.

The other 13 birds died during a cold wave when the minimum air temperatures varied from 9° above to 27° below zero, with an average minimum of 11.5° below. The average dying weight was 521 grams or 59.4 per cent of the initial average of 877 grams.

At the time of this cold wave—12 nights from February 4 to 15, 1933, of which but one showed a minimum air temperature above zero—39 Pheasants were in various stages of emaciation from drastic experiments. While some died, others were extremely emaciated yet survived even the 23° and 27° below zero nights of February 8 and 9, later to recover on full feed. There was no conspicuous mortality of underweight birds, the Pheasants apparently dying during ordinary winter weather when reduced to between 50 and 60 per cent normal weight. Extremely cold weather killed birds in but slightly better condition.

On the basis of the data presented, it would seem that Pheasants reduced to between 55 per cent and 60 per cent of their full weights may find themselves in a particularly critical zone in cold resistance, compared to a wider critical zone between about 55 per cent and 68 per cent of weight for Bob-whites. A correlation between size of Pheasants and Bob-whites and their respective tolerances as famished adults to sub-zero temperatures appears essentially what Kendeigh's findings would lead one to expect. Kendeigh, however, after reading a

[2] We did not have convenient access to metric scales large enough for the weighing of Pheasants; hence, weights of these birds were first taken in quarter ounces and later expressed in grams.

preliminary manuscript of this paper, doubted that the critical zone is wider in Bob-whites than in Pheasants but agreed that it comes at higher weight percentages (letter, March 22, 1935).

Acceleration of Loss Rates from Hunger

A. Bob-white.—The experiments with captive Bob-whites were intended to inquire into sustentative values of winter foods rather than into loss rates of the birds in detail. Moreover, the experiments of drastic nature (in which birds were starved or kept on very innutritious food) were of such short duration that it is virtually impossible to tabulate daily loss figures with any degree of completeness from individual bird records.

It may, nevertheless, be possible to improvise from these records a reasonably accurate and representative loss scale to express the day-by-day decline of typical Bob-whites during mid-winter starvation crises; in this way, the effect of food deprivation in the wild may conceivably be evaluated on the basis of how long it continues, provided that something is known of the initial and current weights of the wintering populations.

The average full weight of 17 captive Bob-whites yielding data on loss rates from acute starvation was 200.9 grams. Let us assume that a bird representing a composite of these weighs 190 grams or about 95 per cent of its full weight by February. Let us assume also that the mean air temperature is about 40° (F.), or a little lower, and that the supply of food suitable for Bob-whites is effectively cut off, as by very

TABLE 1

Composite of Maximum Loss Rates from Starvation Calculated from Records on 17 Captive Bob-whites at a Mean Air Temperature of 40° (F.)

Weight at start of hunger crisis	Loss[1] Day 1	Loss Day 2	Loss Day 3	Loss Day 4	Loss Day 5	Loss Day 6	Loss Day 7	Dying Weight
190 g. (94.5% full weight)	7 g. (3.5% full wt.)	8 g. (3.9% full wt.)	8 g. (3.9% full wt.)	10 g. (4.9% full wt.)	15 g. (7.5% full wt.)	17 g. (8.5% full wt.)	10 g. (4.9% full wt.)	115 g. (57.2% full wt.)

[1] Mainly contents of alimentary tract.

heavy snows or a thick glaze of ice. By piecing together the fragments of data at hand, we may then deduce that a strong Bob-white may starve in a minimum of about one week during fairly mild weather, losing weight at approximately the rates calculated for Table 1.

Deprivation of food the first day apparently may mean little real loss of weight to a prime Bob-white, as much of the 4 to 8 grams difference usually noted may be attributed to the emptying of the alimentary tract of food, although such losses have greater significance to small passerine birds without crops (Baldwin and Kendeigh, 1938).

Wild Bob-whites frequently "lay up" a whole day without feeding, especially after an early snow; and they sometimes hide one day or even two in succession when persistently harassed by shooters or by Cooper's Hawks (*Accipiter cooperi*) (Errington, 1931b).

The second day of a fast is commonly attended by a more distinct drop in weight than the first. This may amount to 8 or 10 grams, bringing the total loss for the first two days up to about 16 grams, inclusive of the unreplenished food used in metabolism and the material passed as feces. Birds down to 175 grams appear to lose at about the same rate for the next two days also, or sufficient to reduce them to the vicinity of 155 to 160 grams.

After the fourth or fifth day, the loss rate tends to be greatly accelerated. This accelerated rate usually varies between 14 and 18 grams per day and continues for about two days before decreasing to perhaps 10 grams on the day of death.

When Bob-whites are in poorer condition to begin with, they starve with greater rapidity, as they also do in cold weather, though not without some apparent exceptions. It may be suspected that some of the birds killed by cold waves early in the season may be hypersensitive individuals in comparatively good flesh.

Loss rates for undernourished birds in the course of more benign experiments show much the same tendency toward acceleration as body weight goes down, though reckoned more aptly in terms of weeks instead of days. In the wild, starving birds are often able to retard their loss rates by eating winter-available fruits and inferior foods (Errington, 1931a; 1936b), but, even so, a great many may weaken and die between the first and second weeks of a winter food crisis (Errington, 1933; 1936c). W. H. Long (quoted by Baldwin and Kendeigh, 1938) demonstrated distinctly greater food consumption of both Pheasants and Bob-whites in very cold weather.

B. Ring-necked Pheasant.—I know of no field data on weight loss rates of Pheasants from hunger, but two lots of experimentally starved

TABLE 2

AVERAGE DAILY LOSSES OF EIGHT PHEASANTS OF STARVATION LOT NO. 1 FROM JANUARY 20 TO FEBRUARY 2, 1933

Date	Jan. 20	Jan. 21	Jan. 22	Jan. 23	Jan. 24	Jan. 25	Jan. 26	Jan. 27	Jan. 28	Jan. 29	Jan. 30	Jan. 31	Feb. 1	Feb. 2
Min. temp. (F.)	9°	20°	34°	23°	27°	33°	24°	22°	14°	18°	27°	19°	20°	8°
Mean temp. (F.)	21°	33°	39°	34°	36°	37°	30°	56°	18°	24°	31°	28°	30°	16°
Average loss (g.)		18	34	16	21	18	28	30	50	28	38	36	38	62

[1]Four birds died, one on each of the following nights: January 28, 30, 31, and February 1.

Pheasants were productive of some data that may be of value. Each lot consisted of eight birds, the first lot starving from January 20 to February 2, 1933, at a mean temperature of 29.2° (F.), and the second from February 3 to 14 at a mean temperature of 1.6°. The birds of lot No. 1 averaged 1012 grams before starving and their maximum recorded average weight was 1065 grams; corresponding average weights

TABLE 3

AVERAGE[1] DAILY LOSSES OF EIGHT PHEASANTS OF STARVATION LOT NO. 2 FROM FEBRUARY 3 TO 14, 1933

Date	Feb. 3	Feb. 4	Feb. 5	Feb. 6	Feb. 7	Feb. 8	Feb. 9	Feb. 10	Feb. 11	Feb. 12	Feb. 13	Feb. 14
Min. temp. (F.)	–10°	–10°	–17°	0°	–14°	–23°	–27°	–9°	–12°	–7°	6°	–1°
Mean temp. (F.)	13°	1°	–3°	10°	–7°	–16°	–15°	3°	0°	13°	12°	6°
Average loss (g.)		46	25	12	30	46	48	40	28	54	28	54

[1] Four birds died, one on each of the following nights: February 8, 10, 11, and 13.

TABLE 4

ACCELERATION OF DAILY LOSS RATES OF UNDERNOURISHED PHEASANT EXPERIMENTAL LOTS

Birds in lot	Av. wt. start expt.	First Wk. Expt.			Second Wk. Expt.		
		Av. daily loss		Mean temp. (F.)	Av. daily loss		Mean temp. (F.)
		Grams	Pct. wt.		Grams	Pct. wt.	
8	1006	34	3.4	—5°	93[1]	9.2	14°
6	990	12	1.2	33°	30	3.0	25°
6	1010	17	1.7	33°	28	2.8	25°
4	906	16	1.8	24°	28	3.1	32°
6	914	25	2.7	24°	35	3.8	32°
3	906	17	1.9	24°	30	3.3	32°
6	821	17	2.1	24°	19	2.3	32°
4	940	13	1.4	24°	6[2]	0.5	32°
8	1012	23	2.3	33°	57	5.6	25°
4	849	16	1.9	29°	12[3]	1.4	39°
4	863	15	1.8	32°	26	3.0	34°
4	884	8	0.9	32°	11[4]	1.3	34°
8	891	9	1.0	34°	9[5]	1.0	32°
4	955	15	1.6	29°	19	2.0	39°
4	792	5	0.6	34°	14	1.8	39°
6	821	19	2.3	39°	26	3.2	40°

[1] Experiment was concluded on fifth day of second week.
[2] Unaccustomed though comparatively adequate diet; decrease of loss rate was probably due to increased experience on the part of the birds.
[3] The six days following the first two weeks brought about a loss rate increased to 19 grams per day at a mean temperature of 23°.
[4] A pronounced acceleration of loss came the third week, when the birds lost an average of 27 grams per day at a mean temperature of 27°.
[5] Unaccustomed though comparatively adequate diet.

for lot No. 2 were 1006 grams and 1100 grams. We do not have exact temperature readings, hour by hour, but the average daily losses of the two lots may be tabulated along with the minimum and mean air temperatures (Tables 2 and 3).

The records of individual birds show a rather slow decrease of weight during the early stages of starvation with an evident acceleration of loss commonly beginning three or four days before death. Aside from this lethal decline, nearly all of the Pheasant lots used in more or less drastic food experiments suffered increasingly higher loss rates after the first week (Table 4).

TABLE 5

COMPOSITE OF MAXIMUM LOSS RATES FROM STARVATION CALCULATED FROM RECORDS ON 16 CAPTIVE PHEASANTS AT MEAN AIR TEMPERATURE OF 16.5° (F.)

Weight at start of hunger crisis	Loss[1] Day 1	Loss Day 2	Loss Day 3	Loss Day 4	Loss Day 5	Loss Day 6	Loss Day 7
1045 g. (95% full weight)	40 g. (3.6% full wt.)	15 g. (1.4% full wt.)	15 g. (1.4% full wt.)	15 g. (1.4% full wt.)	15 g. (1.4% full wt.)	20 g. (1.8% full wt.)	25 g. (2.3% full wt.)

Loss Day 8	Loss Day 9	Loss Day 10	Loss Day 11	Loss Day 12	Loss Day 13	Loss Day 14	Dying Weight
25 g. (2.3% full wt.)	30 g. (2.7% full wt.)	40 g. (3.6% full wt.)	55 g. (5.0% full wt.)	55 g. (5.0% full wt.)	65 g. (5.9% full wt.)	25 g. (2.3% full wt.)	605 g. (55% full wt.)

[1] Mainly contents of alimentary tract.

Temporary accelerations of loss rates also seemed to accompany the more decided drops in air temperature. There are too many variables incorporated in Tables 2 and 3 to present a clear picture of loss rates through hunger alone, but maximum loss rates of a typical bird in moderately cold weather may perhaps be calculated as for the Bob-white in Table 1. Let us say that our typical Pheasant before starving weighs 1045 grams or 95 per cent of its full weight of 1100 grams and that it dies at 605 grams or 55 per cent full weight (Table 5).

There seems to be no essential difference in the way that Pheasants and Bob-whites manifest the effect of undernourishment, except that the Pheasants lose weight more gradually than do Bob-whites and that they are better able to endure vicissitudes when in poor flesh. Experimental evidence suggests that Pheasants may retard starvation for brief periods far more effectively than Bob-whites by feeding upon low quality herbaceous foods (Errington, 1937).

Minimum Living Weights and Rates of Recovery from Malnutrition

A. Bob-white.—During the Wisconsin experiments, 7 Bob-whites were given access to or force-fed substantial food after being reduced almost to the point of death. Of these, all but two died. These two, as indicated elsewhere in this paper, barely survived after one had been reduced to 50 per cent of its full weight and the other to 58 per cent. I think this represents very nearly the minimum level from which recovery is possible under the best of circumstances. Recovery from such a desperate condition was very slow, and virtually no gain in weight was noted during the first week; during the second week, each bird gained about 10 grams; thereafter, at variable weekly rates.

TABLE 6

Rate and Degree of Recovery of Undernourished Bob-whites from Different Stages of Emaciation, January to April 1931; Mean Temp. about 40° (F.)

Per cent full weight to which reduced	No. of birds	Av. gain 1st week	Av. gain 2nd week	Av. gain 3rd week	Av. gain 4th week	Av. gain 5th week	Average per cent of full weight reached during recorded period of recovery
90%	4	8 g.	4 g.	3 g.			96% in 3 weeks[1]
80%	2	8 g.	3 g.	3 g.			89% in 3 weeks[2]
75%	4	9 g.	6 g.	2 g.			81% in 3 weeks[3]
70%	2	12 g.	6 g.				82% in 2 weeks
60%	6	8 g.	10 g.	6 g.	7 g.	2 g.	77% in 5 weeks
50%	1	1 g.	10 g.	1 g.	4 g.	17 g.	66% in 5 weeks

[1], [2], and [3] Weights not recorded weekly after the third week, but additional gains were plainly slight.

Table 6 gives the average rate and degree of recovery of undernourished captive Bob-whites for which data seem most reliable. The recovery rates were computed for experimental lots collectively to reduce variations due to contents of alimentary tracts of individuals. Except for birds in exceedingly poor flesh, the rate of recovery was most rapid in the first week after being placed on full feed; during the next two weeks as a rule the birds recovered about as much as they would with facility; subsequently, they gained a few grams per month until they reached the weight normal to them for the season of the year.

The degree to which the captive Bob-whites were run down had an evident influence on their rate of recovery. The first four birds of Table 6, which were reduced only to 90 per cent of their full weight, easily regained in two or three weeks nearly all that they had lost, whereas the 6 birds reduced to 60 per cent of their full weight had difficulty recovering past the 75 per cent level, even in five weeks. The distinction should be made plain that while the rate of recovery for the first three weeks on full feed was greater for the birds reduced to 60 per cent of their weight, these were months behind the recovery stage shown by the birds reduced only to 90 per cent full weight.

In the wild, a great deal of the Bob-white mortality attending late winter starvation crises may be charged to imperfect recovery from previous emergencies. During the winter of 1935-36, the Bob-white population on one of my observational areas near Ames, Iowa, declined from 21 birds on December 16 to 4 by February 21. The heavy decline came during the cold weather and blizzards of February, and seemed due to the wearing effect of the cold plus intermittent feeding. The birds would find good picking for a few days by following squirrels (*Sciurus niger rufiventer*) in a snow-filled cornfield; then more snow would cover all suitable food for another day or two until the wind subsided, and squirrels again exposed deep-buried corn ears. It seemed simply beyond the recuperative powers of the Bob-whites to cope with recurring, if relatively brief, periods of famine at this time, and their physical trend seemed to be steadily downward as long as the crisis lasted.

Weight data from Bob-whites at the southern and northern extremes of their geographic range suggest that winter loss of weight may be cumulative even during mild seasons. Ten Wisconsin specimens collected at random from ordinarily well fed (but occasionally hungry) coveys in March, 1931, averaged 178 grams or 90.6 per cent of the 196.5 gram average for early winter and mid-winter. Stoddard (1931, p. 76) found the average weight of a series of 43 mature cock Bob-whites trapped in Georgia and Florida during the last week in April and the first week in May to be 154.7 grams, which is 93.6 per cent of the 165.11 gram average obtained from 475 winter cocks. He did not have a large enough series of spring hen weights for comparison but states that hens gain weight as the breeding season approaches—which would make the average seasonal decline of the southern birds still less in proportion. It seems probable that only part of the late winter decline indicated by the Wisconsin specimens represents a normal seasonal rhythm, the rest presumably being the consequence of temporary deprivation of food during snow or sleet storms.

B. Ring-necked Pheasant.—Twenty-four Pheasants of the experimental lots were still alive after having been reduced to an average of 57 per cent of their full weights. These birds may be subdivided into (1) those killed for examination while obviously in critical conditon and before they had proved their ability to recover and (2) those placed on full feed after emaciation but not necessarily after having been irrecoverably run down.

The nine birds of the first group were killed for examination at an average of 477 grams or 52 per cent of their full average weight of 918 grams; one was down to 42 per cent, another to 43 per cent, and another to 48 per cent. The majority of these birds probably would have recovered with feeding.

The average minimum weight of 14 Pheasants that recovered was

621 grams or 61.2 per cent of their full average of 1015 grams, with two birds down to 46 per cent. One other individual was down to 41.2 per cent but became entangled in the wire of its pen and died; this bird seemed weakened beyond recovery, however, as it had continued to lose weight after having been given access to adequate food.

Table 7 summarizes the data on rate of recovery of undernourished Pheasants after having been returned to full feed.

The Pheasants worked with, in contrast with the Bob-whites, seemed to have little difficulty recovering completely from any non-lethal degree of emaciation. Recovery was quickly completed for birds down to 90 per cent of their full weights and was also complete for birds reduced

TABLE 7

RATE AND DEGREE OF RECOVERY OF UNDERNOURISHED PHEASANTS FROM DIFFERENT STAGES OF EMACIATION, JANUARY TO MARCH, 1933; MEAN TEMP. 25.4° (F.)

Per cent full weight to which reduced	Number of birds	Average gain first week	Average gain second week	Average gain third week	Average per cent full weight reached during recorded period of recovery
90%	3	65 g.	45 g.		100% in 2 weeks
85%	11	57 g.	37 g.	14 g.	97% in 3 weeks
80%	11	85 g.	28 g.	23 g.	95% in 3 weeks
75%	11	85 g.	71 g.	14 g.	94% in 3 weeks
70%	11	57 g.	57 g.	37 g.	89% in 3 weeks
65%	5	57 g.	57 g.	40 g.	81% in 3 weeks
60%	7	85 g.	57 g.	34 g.	77% in 3 weeks
55%	2	113 g.	85 g.		60% in 2 weeks[1]
45–50%	3	113 g.			54% in 1 week[2]

[1 and 2] Weights not recorded weekly thereafter, but evidence points to continued gains at rates corresponding to percentages of full weight.

much more, although, as expected, the more an individual had to gain back the more time was required.

Greatly emaciated birds regained approximately their full normal weight in about seven weeks under experimental conditions. Such birds would commonly recover over 60 per cent of their lost weight within the first three weeks, thereafter to gain at progressively diminishing rates.

Discussion

It is apparent from the existing experimental and observational data that winter food crises do not have the malignant significance to wintering Pheasants that they may have to Bob-whites in north-central states. Not only does the Ring-necked Pheasant have superior ability to withstand cold when in poor flesh, but it is much less likely to become emaciated from hunger in the first place. Its loss rates are less rapid in proportion to its weight even while starving, and there is evidence that it can retard starvation during crises by feeding upon buds and other herbaceous foods that are not of comparable nutritive value

to Bob-white (Errington, 1937). Dalke (1937) writes on the basis of his Pheasant work in Michigan, "In winter, the birds . . . may be observed feeding upon grass. If no grain or seeds are easily available, they may feed exclusively on grass for short periods." The Pheasant's greater strength is of distinct advantage to it if the food is covered by snow or ice; and its greater mobility and comparative independence of brushy cover takes much of the pinch out of many local food shortages. Furthermore, the facility with which it regains lost weight when opportunity permits is probably a major reason for the fewness of authentic records of Pheasant starvation in the field.

I am by no means advocating the replacement of the native northern Bob-white by the exotic Ring-necked Pheasant. There are biological, economic, and esthetic angles to questions pertaining to the desirability of encouraging Pheasants and Bob-whites that are not here considered; but, whatever may be the ramifications or controversial aspects of these, it should be useful to conservation workers merely to have a clearer idea of how much better the Pheasant is adapted to forage for a living when the ground is covered with snow and to appreciate more the significance of a uniformly reliable food supply to wintering Bob-white populations.

Summary

Field and experimental data from Iowa and Wisconsin, chiefly obtained between 1929 and 1934, indicate that susceptibility to cold attending decrease in weight was usually much more pronounced in Bob-whites than in Ring-necked Pheasants and that the latter were also better able to retard and to endure starvation as well as to recover after temporary food crises.

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AUDITORY RESPONSES OF STARLINGS, ENGLISH SPARROWS, AND DOMESTIC PIGEONS[1]

BY ALBERT R. BRAND AND P. PAUL KELLOGG

A NATURAL corollary to our studies of pitches of bird voices at the Laboratory of Ornithology at Cornell University is a study of the range of bird's hearing. A few first experiments have been made and while they are far too few to warrant making deductions, still they seem to point to certain little suspected tendencies. Hence this preliminary report.

The methods used in these experiments are similar to those used by Pavlov in his classical animal experiments. We are indebted to numerous persons for aid and suggestions. Dr. H. S. Liddell, Professor of Physiology at Cornell University, advised with us and was most generous with his knowledge and experience in similar experiments. Dr. Arthur A. Allen helped us in numerous ways, with advice and with occasional observations. Dr. Elsa G. Allen helped with the observations, as did Eugene Gerberg; and Kenneth Bennett built and serviced the electrical equipment under the direction of the junior author.

Our first test was made on four captive Starlings (*Sturnus vulgaris*) and it showed that while they are sensitive to about the same high frequencies as man, their range of sensitivity is not nearly so extensive, and that their response to sounds falls off rapidly for frequencies below 1,200 cycles per second (c.p.s.); no response at all being observed to sounds of 650 c.p.s. or lower. Hence, while man has a range of sensitivity of some nine octaves, Starlings appear to have a range of less than five; and this loss is in the lower or middle range at frequencies where man's ear functions acutely.

The exact range of human hearing is rather indefinite; various investigators estimate it differently. However, the authors, both persons with normal hearing, find that at about 16,000 c.p.s. on the high side, and around 20 c.p.s. on the low, the sensation of hearing disappears. These figures can be used as good approximations. Six hundred c.p.s., where the Starlings apparently do not hear, is in the second octave above middle C on the piano, and about the center of the most used human notes. The lowest note on the piano keyboard is 27 c.p.s.; the highest, at the extreme right, is 4138; and the tone called "middle C," which in musical notation is placed on the line between the bass and treble staffs, has a frequency of 259. This is the C at the approximate center of the piano keyboard. To comprehend how insensitive Starlings are to tones that man hears well, we have but to observe that these birds do not hear middle C nor the C an octave above it. Only the four highest octaves on the piano are audible to them; but they are also

[1] Read at the Fifty-sixth Stated Meeting of the American Ornithologists' Union, Washington, D.C., October 19, 1938.

sensitive, as will be elucidated in the following discussion, to about two octaves above the piano range.

The birds were kept in a large two-compartment cage. The larger compartment was outdoors; the smaller was roofed over; the compartments were adjoining; and the birds had free egress and entrance. The observer sat concealed behind the smaller compartment. The birds could feed only on a tray in the smaller compartment. This tray was kept plenteously supplied and was so wired that the observer could, at will, cause a slight electric shock to penetrate the birds' feet. A loud speaker was set up in the inner compartment, wired to an oscillator and amplifier. In this manner pure tones of any desired frequency could be emitted.

When the birds were on the tray a predetermined frequency was given forth by the speaker; a few seconds thereafter the electric shock button was pressed. Unless the birds left the tray before the electric shock they naturally received its full force. In making the early tests, while training the birds to respond, the oscillator was set for a sound of 2,000 c.p.s., a frequency which they heard well. Seven days after beginning these tests the first response was noted. In order not to make the birds too tray-shy at this period, the tests were made but once daily. The birds soon became conditioned to the sound and would leave the tray the instant it appeared. After six more days it was possible to raise the predetermined frequency, though care was used not to do so in any regular sequence. This was done so that the birds should not become conditioned to any particular note.

The birds were allowed to feed only when an observer was present, for the tray was covered and inaccessible for feeding at all other times. This insured the observer action when he was present. However, there seemed to be a constant struggle going on in the birds themselves after they once learned that the tray carried a pain-giving shock, and only excessive hunger could tempt them to the tray. In the Starling experiment one bird rarely came to the tray and fed mainly on food which the other birds, in their eagerness to get food, dropped from the tray. This bird finally died of starvation; seemingly the fear of the tray being so great that rather than submit to this terror the bird allowed itself to starve. In the later experiment with English Sparrows we also lost one bird in this manner.

It was found that between 14,000 and 15,000 the Starlings' responses were less acute. They would cock their heads and listen for a second before leaving the tray. Above 15,000 they made no response, whatever. At 15,500 they would go on eating contentedly. Further tests were made up to about 20,000 c.p.s. with negative results. Apparently these four Starlings did not hear above 15,000.

After determining the high point, the sounds from the loud speaker and oscillator were gradually brought down. At 1,000 c.p.s. response was good, but below that point it diminished rapidly, though there was

some response down to 700. Below that figure there was no response whatever. The birds would come into the compartment while the speaker was on, obviously not hearing it, for by this time they were extremely nervous and afraid of the tray and even of the compartment in which the tray was located. They would stand on the tray eating, quite oblivious to the speaker, which produced a powerful 600 c.p.s. tone.

As a check on the Starlings' deafness to tones between 600 and 700 c.p.s., a violin was secured. The fundamental of the E string of the violin is 652 c.p.s. However, the harmonics of the E string are quite strong. A 600 c.p.s. pure tone on the oscillator, loud speaker set-up, brought no response; playing the E string on the violin softly brought little or no response; but if it were played loudly the birds left the tray hurriedly in the same manner as they did formerly. This suggests that when the E string on the violin was played vigorously they perceived the harmonics which would be well within their auditory range; but that they do not perceive, at any time, the fundamental tone of the E string.

It is interesting to note that a study of the song of the Starling made from oscillograms taken in nature show no frequencies in the song below 1,100 c.p.s. (Brand, 1935; 1938) 1,100 c.p.s. was found only once; 1,375, the next lowest note in the song, appeared several times. Thus it would seem that the sounds produced by the Starling are in the range where their hearing is very acute.

Our next experiment was with five English Sparrows (*Passer domesticus*). It took these birds about the same time as the Starlings to become conditioned. However, after a week of learning we were able to proceed. The results were similar to those with the Starlings. The range, 11,500 on the high side, 675 on the low, was much less than human range and mammalian range in general, but all sounds responded to were within the range of sounds the bird normally produces.

The third experiment was with Domestic Pigeons (*Columba livia*). Here again, though we found the Pigeons' hearing went an octave or more lower than the other birds, the subjects showed no hearing responses at frequencies easily audible to man. The range of Pigeon hearing was 7,500 on the high end, and they lost all sensitivity below 200. Two hundred c.p.s. is not a low note being about the G below middle C on the piano.

It is much too early to come to any definite conclusions from these very meagre experiments. Many more species must be tested and more data accumulated before anything definite can be said, but the indications are that birds hear over a much more limited range than mammals. Whether this is true of all or most birds is still to be discovered. Further investigation in this field should prove most fruitful.

Summary

Starlings showed a positive range of hearing 700 to 15,000; the English Sparrow range was 675 to 11,500; and the Pigeon, 200 to

7,500 cycles per second. All the birds showed decreasing sensitivity as the extremes were approached. Thus the Pigeons did not seem very sensitive to sounds below 500, though they could hear until 200 was reached, and the Starlings showed decided loss of sensitivity about 12,000, though they continued to hear till 15,000. Comparing the apparent hearing of these three species of birds to human hearing, we find that man hears about four octaves lower than Pigeons and five lower than Starlings and English Sparrows. At the high end of the hearing range, man normally hears at least as high as the two latter species and about an octave higher than Pigeons. The species tested are evidently deaf to tones in the moderate and low range of hearing, tones that man hears extremely well.

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THE GREAT LAKES ORNITHOLOGICAL CLUB

BY J. H. FLEMING

ABOUT the year 1900, a small group of ornithologists living in the region of the Great Lakes, became increasingly aware of the need for closer cooperation. These men were, William E. Saunders of London, Ontario; Percy A. Taverner of Detroit, Michigan; the late Bradshaw H. Swales of Detroit and Grosse Isle, Michigan; the late A. Brooker Klugh of Guelph, Ontario and James H. Fleming of Toronto, Ontario.

The question of migration routes was uppermost in our minds and there arose some correspondence with Professor Lynds Jones of Oberlin, Ohio. About this time we were joined by the late J. S. Wallace of Toronto, Ontario. He was a business man interested in birds, whose duties necessitated frequent visits to southwestern Ontario and to Detroit where he had a wide acquaintance among Michigan naturalists, as he had in the various centres he visited in Ontario. The result was that by personal contacts, Wallace kept us informed by the movements of birds in southwestern Ontario, and we decided to form the Great Lakes Ornithological Club with a membership of six, which number was never increased.

We soon found the need of a journal of some sort in which problems of bird life could be discussed. The result was a manuscript bulletin, Saunders acting as secretary. The procedure was simple—any member with an idea relating to birds wrote it out on a sheet of eight by ten inch paper, and posted it to the secretary in an especially printed envelope marked "Printer's Mss." The secretary, if so inclined, added comments on a separate sheet of paper and forwarded the bulletin to the next member and so on in rotation, till it reached the original sender who removed his contribution and forwarded the remaining manuscript to the secretary who also removed his from the file and added any new matter that had come to hand with his comments but always on a fresh sheet of paper, thus the bulletin passed in rotation to the six members but never grew too bulky. The private character of the bulletin allowed for freedom of expression and a certain amount of sarcasm, if thought necessary. Some of the subjects dealt with were migration routes, injurious species, the mild winter of 1905–6, and even subspecies. The bulletin ran along fairly well from 1905 to 1909 with occasional revivals and proved a useful means of communication.

The Club soon felt the need of a suitable place to meet, preferably a place where migration could be studied and Saunders suggested Point Pelee, projecting some nine miles into Lake Erie at the western end, and also the most southern point of the mainland of Canada.

The first visit of the Club to Point Pelee was in September 1905, though Saunders had made several previous visits, the first dating back to 1884.

In "The Birds of Point Pelee" by Taverner and Swales, published

Great Lakes Ornithological Club at the Point Pelee Camp, October 1, 1909
Left to right: Wallace, Swales, Saunders, Taverner (lower), Fleming

UNIV. OF MICH.

in *The Wilson Bulletin*[1] there is a full account of the activities of the Club at Point Pelee, up to August 1908. This gives an annotated list of the birds observed.

A permanent camp was established in October 1908 and was occupied at intervals to the end of 1927.

From the first a journal was kept of the birds observed at Point Pelee, this journal being in two volumes beginning May 13, 1905, and ending December 22, 1927.[2] A printed list of Ontario birds took up the first column for every six pages, with room for additional species, followed by two blank pages for a general write-up of events. The number of birds seen each day was recorded in ruled columns of the six pages. Each evening the list of birds was read aloud by one of the members and the entries were made with the aid of all members of the Club present from their field notes.

During the period of the Club's activity several new birds were added to the Ontario list, but the chief benefit was a better understanding of the migration routes, and the periodicity of numbers and species.

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[1] *Wilson Bulletin*, No. 59, June 1907, pp. 37–54; *ibid.*, No. 60, September 1907, pp. 82–99; *ibid.*, No. 61, December 1907, 133–53; *ibid.*, No. 63, June 1908, pp. 78–96; *ibid.*, No. 64, September 1908, 107–29.

[2] Now in the library of the Royal Ontario Museum of Zoology, Toronto, Ontario.

267 Rusholme Road, Toronto, Ontario.

GENERAL NOTES

Bald Eagle near Stillwater, Oklahoma.—There are so few records of Bald Eagles from Oklahoma that its appearance near Stillwater, January 4, 1939, may be of interest. An adult bird, presumably *Haliaeetus leucocephalus leucocephalus*, was observed from an automobile by a party of five persons at R. 1 E, T. 19 N, S. 14, Payne County. The car was stopped about 75 feet from the thirty-foot elm tree which served as a perch and the eagle remained until all five occupants had made thorough observations. The bird flew a few hundred yards away and alighted in another tree. All present took note of the bird's white head and tail.—GEORGE A. MOORE and JOHN D. MIZELLE, *Stillwater, Oklahoma.*

King Rail in Michigan in Winter.—A King Rail (*Rallus elegans*) was received in the laboratory of the Game Division, Michigan Department of Conservation, on December 9, 1938. The bird was sent in by conservation officer Thomas White of Houghton Lake, Michigan, who reported that it was taken from a muskrat trap on December 7, about three miles east and one and one-half miles south of Prudenville, Michigan.

An examination failed to reveal any injury other than those resulting from the trap or any diseased condition that would have prevented normal flight. The bird was a male, in adult plumage, but was a bird of the year as evinced by the presence of a bursa Fabricii.

While there are other winter records of this species in Michigan, this is probably the first record from a point so far north in the state.—W. CARL GOWER, *Game Division, Michigan Department of Conservation, Lansing.*

Twilight Flight of the Black Tern.—During many summer evenings and week-ends between 1934 and 1938, I had abundant opportunity to observe an interesting twilight flight of the Black Tern (*Chlidonias nigra surinamensis*) at Whitmore Lake. This Michigan lake is about twelve miles north of Ann Arbor, and is approximately six hundred acres in extent. Within a five mile radius of Whitmore Lake are many bodies of water ranging in size from a glacial pothole of a fraction of an acre to lakes several hundred acres in extent. Horseshoe Lake, a mile and a half to the south, is one of the largest in the immediate vicinity. Many of the lakes, including Whitmore and Horseshoe, usually have annual nesting colonies of Black Terns.

During the summers between 1934 and 1936 the water level of Whitmore Lake was several feet below normal, thereby exposing many suitable nesting sites for Terns. As a consequence twenty to forty pairs nested annually. The water level was raised several feet in 1937, the nesting sites were covered with water, and no Terns nested then. In 1938 three pairs nested despite the high water level. They placed their nests upon some boards that were floating in a small marsh at the southern end of the lake.

The nesting birds at Whitmore Lake and visiting Terns from neighboring lakes fed singly, in pairs, or small groups over the entire lake throughout the day. About an hour before sunset large hatches of aquatic insects began emerging, and the Terns became more active in their food gathering. This increased activity of the birds continued until sunset. Shortly after sunset the scattered Terns from the Whitmore Lake colony (in those years when a colony was present) ceased their active feeding and began to gather in a flock. At the same time they became much

more vociferous. The flock usually flew in great circles about the central portion of the lake and within one hundred feet of the water. At frequent intervals the circling flock flew over or near the nesting colony. Each time this occurred some or all of the birds in the flock would swoop down over the colony, apparently attempting to persuade or chase their mates from the nesting sites. After several such attempts the majority or all of the adults would be in the air. About half an hour after sunset the flock began to call loudly and to ascend in great spirals. At the same time it would assume the customary flock formation employed by the species in migration, namely a long, horizontal, arc-shaped formation with its slightly bowed center in the lead. About the time the flock began its ascent other groups of Terns, usually in arc-shaped formation, could be seen coming from neighboring lakes and ponds to join the Whitmore Lake flock. The group coming from the direction of Horseshoe Lake was always the largest, consisting of ten to thirty individuals.

The visiting flocks were usually silent as they approached the lake, and their arc-shaped formation gave every indication of migrating birds. When a visiting flock came wthin a few hundred yards of the Whitmore Lake birds, both groups began to call excitedly and, upon meeting, would merge together. Between 1034 and 1936 the combined groups of several lakes totaled between seventy and ninety Terns.

The length of time the combined flock remained together depended upon weather conditions. If the evening was warm, and especially if there was a bright moon, the flock, or a portion thereof, would remain in the air until as late as ten o'clock. On cool evenings the flight was of shorter duration. The height to which the group ascended depended upon weather conditions. If there was little wind the birds would occasionally ascend out of sight of the naked eye, and then only their calls could be heard. On cool, windy evenings the flock seldom flew above one hundred feet. The first evidence of disintegration of the flock was the leaving of the nesting pairs of Whitmore Lake birds. These pairs usually traveled at great speed towards their nesting site, with one of a pair in apparent pursuit of its mate. Upon reaching the nesting site the foremost bird would settle upon or beside the nest. Sometimes the pursuing bird would return to the main flock again. With the return to the nesting sites of the Whitmore Lake birds the visiting groups would leave for their respective lakes or ponds in the same manner in which they came.

Each year this twilight flight was first noted in early June as the nesting colony was becoming established, and continued until the departure of the summer resident birds in August. The flight was most pronounced from mid-June until the time the young began flying. These flying young seemingly distracted the old birds, for the young would trail behind the flock calling lustily, and adults were constantly leaving the group to accompany the young. As the young became more adept at flying they would join the old birds, but the flock never regained its former unity.

The disappearance of the Whitmore Lake adults and their young generally coincided with the first cool period in August. These cool spells usually occurred between August 4 and 20. I believe I saw the resident birds leave on August 9 of 1936. The birds began calling loudly on the mid-afternoon of that rainy day, and began assembling in a flock just as they did throughout the summer at twilight. After much calling and flying around the lake in arc-shaped flock formation the group disappeared in a southeasterly direction. After the summer residents left only transient birds were seen. The transient numbers varied greatly in daily abundance, and individuals usually remained only for a few hours or days. The transients which accumulated at the lake during the warm periods usually left at the beginning of cool spells. Because of the distinctive appearance of mottled individuals in August the daily observer could readily identify most individuals. Identifications of transients were especially easy because of their small numbers.—Milton B. Trautman, *University of Michigan Museum of Zoology, Ann Arbor.*

Note on the Speed of Flight of the Prairie Chicken.—On April 28, 1937, while I was driving on a straight stretch of gravel road about 7 miles north of Glennie, Alcona County, Michigan, a Prairie Chicken (*Tympanuchus cupido*) flushed about 50 feet ahead of the Ford truck. The bird flew straight down the road for approximately one tenth of a mile at an altitude equal to that of the truck, and then swerved across the road and gained an altitude of about 20 feet but continued parallel with the road for another tenth of a mile, after which it landed in the open prairie beside the road. The speedometer registered 42 miles per hour throughout the observations, and I could not perceive any gain or loss of distance by the bird.

At the take-off, the Prairie Chicken made several rapid wing strokes to gain altitude. Once launched, the flight alternated between short glides interspersed with 4 or 5 choppy wing strokes. This observation was made at 9:30 A.M. The day was cloudy and overcast, and there was no wind.—DAVID S. SHETTER, *Institute for Fisheries Research, Michigan Department of Conservation, Ann Arbor, Mich.*

The Starling in Colorado.—During the past two or three years we have received reports that the Starling, extending its range westward, has been seen in the northeastern corner of Colorado, but none of these reports could be definitely verified. On November 16, 1938, the writer, while idly watching great flocks of Red-winged Blackbirds flying overhead, saw several birds which appeared to be Starlings, but as they were far out of gun range, no specimens were taken. This experience was repeated on November 20, 23, 26, a total of between seventy-five and one hundred of these birds being seen, all of them, with one or two exceptions, being in company with Red-winged Blackbirds.

On December 17, 1938, in company with Alfred M. Bailey and Robert J. Niedrach, of the Colorado Museum of Natural History, the writer again visited the Mile High Duck Club, in Adams County, twenty-five miles northeast of Denver, the place where the first birds were seen, and after closely observing the very large number of Red-wings, two Starlings were definitely identified in flight by Mr. Niedrach, who was far more familiar with the species than the writer. Shortly thereafter, a single bird was taken from the midst of a large flock of blackbirds, which, so far as we know, is the first definite record for Colorado. The specimen (C.M.N.H. No. 19567) is a male. The following afternoon we returned to the Club and saw one flock of approximately twenty-five birds, a group of five, and a single bird, all going to the evening roost, with the hordes of blackbirds. Another Starling was taken for the museum collection (C.M.N.H. No. 19568) at that time. On December 19th we visited the vicinity of Barr Lake and saw a flock of twenty Starlings feeding among cattle along the roadside, and three others were observed near the Mile High Club, perched in willows.—ROBERT B. ROCKWELL., *Colorado Museum of Natural History, Denver, Colorado.*

Starlings in Colorado and Western Kansas.—Although rapidly moving westward, Starlings (*Sturnus vulgaris*) are still uncommon in Colorado and western Kansas where the following two records were obtained. On December 22, 1938, a flock of about 80 Starlings was seen 23 miles south of Kinsley, in southern Kansas, 140 miles east of the Kansas-Colorado line. On January 27, 1939, a flock of 69 was observed by the writer and Frank F. Poley in the valley of the South Platte River one mile east of Atwood in northeastern Colorado, 60 miles west of the Kansas-Colorado line. Specimens were collected from each of these flocks by the writer.—RALPH H. IMLER, *U.S. Biological Survey, Denver, Colorado.*

EDITORIAL

As we take over for 1939 the editorial responsibility which Dr. Stephens has carried so successfully for fourteen years, we view with greatest admiration and respect the work he has done. Few of our members can properly visualize the work that has gone into the careful editing and publishing of fifty-six *Bulletins*, over four thousand pages. During his editorship the *Bulletin* has continued to grow and improve and much of the resulting growth of the Club should be credited to his tireless efforts. As President and Editor Dr. Stephens has been actively employed in the Club's interests during seventeen years. Probably no one but Dr. Lynds Jones himself has put more work into the Wilson Ornithological Club. Fortunately we may look forward to his continuing as a member of the Executive Council to help in directing the Club's policies.

Preparations are already being made for the next Annual Meeting in Louisville, Kentucky on December 1 and 2. The Local Committee is: Leonard Brecher, Floyd S. Carpenter, William H. Clay, Evelyn Schneider, Mabel Slack, James Boswell Young and Burt L. Monroe, Chairman. They wish it announced that they are arranging to have an exhibit of bird photographs. Further details will be given in our next issue or may be obtained by addressing the committee.

There is sometimes raised the question of whether the *Bulletin* should publish reviews and lists of literature. Positive answers to this question appear in two places in Dr. Pettingill's article on "The Wilson Ornithological Club of Today" elsewhere in this number. In reply to his questionnaire, 65.4 per cent of our members expressed a desire for more reviews than have appeared in the past. Our Secretary also brought out the fact that only about 40 per cent of our members also belong to the American Ornithologists' Union and thus have access to the reviews appearing in the *Auk*. We may assume that most of the rest of our members are dependent on the *Bulletin* for their knowledge of what is being published on birds.

We sincerely hope that this and future numbers of the *Bulletin* will elicit many frank suggestions and comments from our members. Otherwise it will be impossible for us to publish a *Bulletin* truly representing the Club.

Ornithological News

Frederick M. Baumgartner has accepted an Assistant Professorship at Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma.

On February 9 Joseph Beal Steere, noted explorer and author of papers on the taxonomy and zoogeography of South American and Philippine birds, celebrated his ninety-seventh birthday at his home in Ann Arbor, Michigan.

George M. Sutton and Thomas D. Burleigh have left for Mexico where they will be joined later by J. B. Semple. They expect to work in Tamaulipas, Nuevo Leon, Coahuila, and Vera Cruz. Fred Loetscher, a Cornell graduate student, will meet the party in Vera Cruz.

Pierce Brodkorb and Arthur E. Staebler left February 14 to work in Chiapas, Mexico.

The Illinois State Natural History Survey, in cooperation with the Department of Zoology of the University of Illinois, the Illinois Department of Conservation, and the National Association of Audubon Societies, is conducting a comprehensive program of research into the life history, ecology, and economic relations of the Crow in Illinois. They wish to stimulate widespread interest in the banding of Crow nestlings, especially in the northern states and Canada. If persons not possessing bird-banding permits locate crow nests, they are urged to obtain bands from C. T. Black (204 Exper. Zool. Laboratory, Champaign, Ill.) or from R. H. Pough (Nat. Assoc. Aud. Soc., 1006 Fifth Ave, New York City).

ORNITHOLOGICAL LITERATURE

THE CALIFORNIA WOODPECKER AND I. A STUDY IN COMPARATIVE ZOOLOGY. By William E. Ritter. Berkeley: University of California Press. 340 pp. $3.50.

A philosophical discussion of the way of life of birds and men. The first part—"Chiefly Woodpeckers"—describes the behavior of *Balanosphyra formicivora bairdi*, a strikingly colored bird on head, wings and rump; much space is devoted to the remarkable communal storing of acorns in holes drilled in the bark of trees, and brief accounts given of the communal nesting. These woodpeckers live almost entirely on acorns, but have to wedge them into a hole or cranny before they are able to hammer them open. Sometimes they store nuts in inaccessible places, and occasionally they place pebbles in the holes. The stores are defended from Jays, Lewis Woodpeckers and squirrels. The author mentions the storing of food by Shrikes, Jays, and Nutcrackers, but does not mention the occasional occurrence of such activity in the Red-headed Woodpecker. As to nesting, three or four birds were seen excavating one hole, a female accepted two males in quick succession, two females sometimes lay in the same nest, while several adults feed the young of one nest. The males are more zealous in nesting duties than are the females, as is the rule with woodpeckers.

It is a great pity that the birds were not captured and marked with bands, colored feathers, or something of the kind; such a set-up should be studied in detail and inter-group relations determined. The value of the map on page 56 would have been much greater if the scale had been given.

The last three parts of the book deal with "Chiefly Both of Us"; "Mind, Brain, Conduct;" and "Chiefly Myself". Here the author is concerned with comparative anatomy, physiology and neurology, and in pleasant, informative style he discourses on many angles of his subjects. There is an index and a list of references.—M.M.N.

CATALOGUE OF BIRDS OF THE AMERICAS: PLOCEIDAE, CATAMBLYRHYNCHIDAE, FRINGILLIDAE. By Charles E. Hellmayr, Field Museum of Natural History, zool. ser., 13, part 11, vi + 662 pp. Dec. 31, 1938. $5.00.

With the appearance of this "Part" there nears completion after twenty years what is not only one of the thickest volumes on birds ever published (it is now 15 inches thick) but surely one of the most useful. Volume 13 of Field Museum's Zoological Series began to appear in 1918 and now, after the publication of 4,561 pages, there remain to be treated only the hawks, gallinaceous birds, "water birds," and other "ancient types" of birds.

For every recognized New World form of these families there is given in this work: the scientific name, an English name, scientific synonymy and important references, geographical range in brief, and a list of localities from which Field Museum has specimens. In addition, brief taxonomic characterizations are given in a great many instances. To do this was a tremendous undertaking but the author has succeeded admirably, especially in the case of the species of the Neotropical fauna on which he has long been an acknowledged authority. Unfortunately this Part shows clearly some ill effects of the author's long absence in Europe. Most of the forms which Dr. Hellmayr marks as unknown to him are in other collections in the United States whence they would instantly have been loaned to him on request. The manuscript was apparently finished at least seven years ago and then was recently and, perhaps, a little hastily, brought up to date just before going to press. Like preceding Parts, it is characterized by the resurrection of a certain number of old scientific names, and by the "lumping" in one species of forms not previously considered conspecific. Relatively few of these changes concern species of the A.O.U. Checklist area.

A feature of this series which we have always found hard to understand is the wholesale fabrication of English bird names. The utility of supplying long and

often stilted English names for birds ordinarily seen in life only by Spanish and Portuguese-speaking people is certainly doubtful. Perhaps that is why it has been so hastily done. Consequently, as in earlier Parts, there arise such regretable errors as repeatedly providing the same English name for two different species, as Ashy Sparrow (pp. 528 and 541) and Black-headed Finch (pp. 347 and 439). Our familiar Eastern Grasshopper Sparrow is still thus labeled but *the* Grasshopper Sparrow we find is *Myospiza humeralis humeralis* of South America (p. 477). That these careless duplications are habitual in this series may be shown by calling attention to a few earlier cases like: Lesson's Oriole (part 10, 1937, pp. 115 and 129), Thick-billed Euphonia (part 9, 1936, 49 and 52), Black-throated Euphonia (loc. cit., pp. 17 and 56), Baird's Flycatcher (part 5, 1927, pp. 127 and 214), Lawrence's Flycatcher (loc. cit., pp. 185 and 215), and Yellowish Flycatcher (loc. cit., pp. 214 and 246). The hasty work of some editorial clerk may also be responsible for such quaint names in the present Part as "Screaming Seed-eater" (p. 201), "Superciliated Seed-eater" (p. 172), or "Mrs. Dickey's Bunting" (p. 109) but it was no ordinary man who was inspired to call one poor little sparrow by the English name of "Papallacta Atlapetes" (p. 391). Another unfortunate sparrow is named the "Venezuelan Grasshopper Warbler" (p. 477).

Field Museum has always been generous about sending complimentary copies of these volumes to research libraries and to technicians in this field but it is regretable that they find it necessary to fix so high a price on the copies for sale—the only source for younger workers. The prices on the parts so far issued of this volume add to the imposing total of $40. For paper-bound volumes without illustrations (except for one color plate in each of the first four parts) this seems rather high. We are also puzzled to comprehend the aims of an institution which prints less than 800 copies of a work like the present (for example, the edition of part 10 was 772), and yet finds it possible to publish and give away each year more than 5,000 equally expensive Annual Reports that are of little value to the scientific world.

This book is of course a necessity for anyone doing serious work on the taxonomy or distribution of New World birds.—J.V.

AN ECOLOGICAL GLOSSARY. By J. Richard Carpenter. University of Oklahoma Press, Norman, 1938: 12mo, viii + 306 pp., 12 appendices. $4.00.

Ecology has long been noted for the profusion of its terminology. Any effort to define and index these terms is most welcome. Mr. Carpenter has listed for us in alphabetical order nearly 3,000 words and phrases proposed by ecologists. These are accompanied by brief definitions and references to the original or later important uses or discussions. Many ecologists will note the absence of some favorite term, or will criticize the author for listing only the original meaning of some word which has gradually acquired a rather different one, but the fact remains that the author has done a noteworthy job in preparing this glossary by which every ecologist can profit.—J. V.

AVES, ZOOLOGICAL RECORD, 74, 1937, published in 1938. By W. L. Sclater. 7s, 6d+ 2d postage. Zoological Soc. of London, Regent's Park, London, N.W. 8.

We have been surprised at the number of bird students who are overlooking this valuable index to ornithological literature or do not realize that the separate AVES section can be conveniently purchased at a small price. The 1937 section, now available, is a booklet of 116 pages which lists, with full title and reference, 1699 ornithological references and cross-indexes them fully under topics, geographical regions, and taxonomic units. Obviously this index is not all-inclusive but it seems to be growing steadily better. More general support, both moral and financial, from American ornithologists would do much to assist.—J. V.

A Laboratory and Field Manual of Ornithology. By Olin Sewall Pettingill, Jr. Minneapolis: Burgess Publishing Co. 1939. ii + 127 pp. $1.70.

The appearance of a new manual for ornithology courses is an event of great interest to the ever-increasing army of bird students and teachers. The present manual is much the most thorough and accurate we have seen. It is divided into two parts, designed for laboratory and for field studies.

The first part, naturally much the longer, treats of the anatomy, characters of birds, classification of birds, plumages and coloration, distribution and migration, the living bird in captivity, and the measurements and weights of birds. The last four categories seem to be new to such manuals. We are glad to see at the head of the section on measurements of birds a statement of some of the uses of such records. Too many recent "life history" studies of birds have included many measurements, especially of young, which lead the reader nowhere and are often not even usable.

We only wish the second part, devoted to field studies, could have been treated a little more fully. Space was probably limited, but even three or four additional pages, outlining what the field worker should look for, would have enhanced the usefulness of the manual. We note few typographical errors, a misspelling of zooerythrin (p. 93) being the only one that might lead the student astray.

This is an excellent class manual which will do much to promote the successful teaching of ornithology.—J.V.

Short Papers

Blair, W. F. The Biotic Districts of Oklahoma. *Amer. Midl. Nat.*, 20, No. 2, Sept., 1938: 425-454.

Brodkorb, P. New Subspecies of Birds from the District of Soconusco, Chiapas. *Univ. Mich. Mus. Zool. Occ. Papers* No. 401, Mar. 1, 1939: 1–7—*Crypturellus cinnamomeus soconuscensis; Odontophorus guttatus matudae; Oreopyra viridipallens ovandensis; Pteroglossus torquatus esperanzae; Oncostoma cinereigulare pacifica* subspp. nov. from Chiapas.

Gray, A. M. Winter Foods of the Bobwhite Quail in the Black Belt Soil Province of Alabama. "Issued by Dept. of Conservation," Montgomery, Ala., 23 pp., 2 tables, 1 map.

Nelson, A. L., Talbott E. Clarke, and W. W. Bailey. Early Winter Food of Ruffed Grouse on the George Washington National Forest. *U.S. Dept. Agri., Circular No.* 504, Dec., 1938: 1–37, figs. 1–30. $.05 of Supt. Documents.—In Virginia and West Virginia.

Riley, Gardner M., and Emil Witschi. Comparative Effects of Light Stimulation and Administration of Gonadotropic Hormones on Female Sparrows. *Endocrinology*, 23, Nov., 1938: 618–24.

Thomson, A. L. Some Remarks on the Present Position of the Orientation Problem. *Bull. British Orn. Club*, 59, Jan. 21, 1939: 35-9.

———. Review of the Past Year [in Ornithology]. (November 1, 1937, to October 31, 1938). *Ibid.* :30-35.

Wolfe, L. R. A Synopsis of North American Birds of Prey and Their Related Forms in Other Countries. *Bull. Chicago Acad. Sci.*, 5, No. 8, Dec. 23, 1938: 167-208, 10 maps. $.25.—An interesting compilation of the characters and approximate ranges of these birds. The breeding ranges of the various subspecies of ten species are diagramed on small scale outline maps. We understand that the object of this paper "was to help the average bird student in this country to a better understanding and appreciation of American birds of prey by pointing out in abridged form their relationships with those of other countries." In view of this objective, the omission of several well-known subspecies of the Duck Hawk and of other species should not be taken too seriously.

PROCEEDINGS OF THE WILSON ORNITHOLOGICAL CLUB

By Olin Sewall Pettingill, Jr., Secretary

At the invitation of the University of Michigan, the Wilson Ornithological Club held its Twenty-fourth Annual Meeting in the Museum of Zoology in Ann Arbor on November 25–26, 1938. The occasion marked the Fiftieth Anniversary of the organization. Headquarters were in the Michigan Union and the Michigan League.

The two-day meeting was occupied with two business sessions, several short meetings of the Executive Council, and four program sessions. An ornithological art exhibit, held jointly by the Wilson Ornithological Club and the Ann Arbor Art Association, took place in the new Rackham Building. Saturday noon members of the Wilson Ornithological Club were guests of the University of Michigan at a luncheon at the Michigan Union. Saturday evening members and visitors enjoyed the Annual Dinner at the Michigan Union.

Business Sessions

The first business session was called to order by President Margaret M. Nice on Friday morning at 9:30. The minutes of the previous meeting were approved without being read since they had already been published in *The Wilson Bulletin*. The reports of the Secretary, Treasurer, Librarian, and Endowment Committee were read and approved.

A list of persons nominated to membership during the current year was placed on the table for approval by the organization.

An Amendment to Article III, Section 4, of the Constitution, proposed at the Twenty-third Annual Meeting at Indianapolis, was unanimously accepted. As amended, Article III, Section 4, reads: "The officers and past presidents of the Club and three additional members, who shall be elected from its voting members by the Club, shall constitute an Executive Council. The business of the Club . . ."

The President appointed three temporary committees.

They were:

Resolutions: S. Charles Kendeigh, W. J. Breckenridge, Amelia R. Laskey.

Auditing: Gustav Swanson, Burt L. Monroe, Richard L. Weaver.

Nominating: Harry W. Hann, Lawrence H. Walkinshaw, Eugene P. Odum.

The second and final business session was called to order at 5:30 Saturday afternoon. Persons nominated to membership during the current year were formally elected. Reports of the Conservation and Index Committees were read and approved.

The Resolutions Committee presented the following resolutions which were then adopted:

Whereas, the Wilson Ornithological Club is an organization interested in the conservation of wildlife and is interested in the maintenance of natural habitats, be it *Resolved*, that this organization go on record as favoring the preservation of representative relic areas such as the oak openings west of Toledo, Ohio, and the proposed Great Plains National Monument.

Resolved, that the Wilson Ornithological Club at its Twenty-fourth Annual Meeting on November 25 and 26, 1938, at the Museum of Zoology of the University of Michigan expresses its thanks and appreciation to Mr. Frederick M. Gaige, Director of the Museum of Zoology, to Dr. Clarence Yoakum, Dean of the Horace H. Rackham School of Graduate Studies, and to President A. G. Ruthven of the University for the use of its buildings, equipment, and for the luncheon on Saturday noon; and to the Local Committee, consisting of Messrs. Van Tyne, Brodkorb, Hann, Hinshaw, and Tinker, for the hospitality and excellent arrangements that they have provided; and be it further *Resolved*, that the Wilson Ornithological Club expresses its thanks to the Local Committee for arranging the excellent exhibit of bird art work and to Mrs. William A. Comstock for the loan of the fine series of Frank Benson etchings.

Whereas, Mr. S. E. Perkins III, Treasurer of the Wilson Ornithological Club since 1935 has resigned this office because of ill health, and

Whereas, Mr. Perkins has shown exceptional interest, energy, and enthusiasm in performing the duties of this office, be it

Resolved, that the Wilson Ornithological Club express its great appreciation and indebtedness to him and hope that he will have a speedy recovery in health.

The Nominating Committee offered the following report:

President—Margaret M. Nice, 5708 Kenwood Avenue, Chicago, Illinois.

First Vice-President—Lawrence E. Hicks, Ohio State University, Columbus, Ohio.

Second Vice-President—George Miksch Sutton, Cornell University, Ithaca, N. Y.

Secretary—Olin Sewall Pettingill, Jr., Carleton College, Northfield, Minnesota.

Treasurer—Gustav Swanson, University Farm, University of Minnesota, St. Paul, Minnesota.

Additional Members of the Executive Council—Maurice Brooks, University of West Virginia, Morgantown, West Virginia; S. Charles Kendeigh, University of Illinois, Champaign, Illinois; Miles D. Pirnie, W. K. Kellogg Bird Sanctuary, Battle Creek, Michigan.

The report of the Nominating Committee was accepted by motion and the Secretary was authorized to cast one ballot for the nominees thus electing them officers of the Wilson Ornithological Club for the ensuing year.

The session was formally adjourned at 5:50 P.M.

Meetings of the Executive Council

Dr. Josselyn Van Tyne reported that the Library Committee has selected as the official Wilson Club book-plate an attractive design presented to the Club several years ago by Dr. George Miksch Sutton. This design bears a drawing of the Long-eared Owl,—an appropriate bird since it is named after Alexander Wilson.

Dr. T. C. Stephens was re-elected Editor of *The Wilson Bulletin* for 1939.

Considerable time was devoted to a discussion of more adequate ways and means of soliciting members. It seemed desirable for the President to appoint a Membership Committee with representatives in various states and provinces. The duties of such a Committee were outlined by the Secretary in his report.

The question of holding double sessions during Annual Meetings of the Wilson Ornithological Club was discussed. It was the concensus of opinion of Councillors present that double sessions were undesirable.

The Council accepted the invitation of the Kentucky Ornithological Society and the C. W. Beckham Bird Club to hold its Twenty-fifth Annual Meeting in Louisville, Kentucky. The meeting will take place on Friday and Saturday, December 1–2, 1939.

Program Sessions

The first program session began on Friday at 10:00 A.M. Mr. Frederick M. Gaige, Director of the Museum of Zoology, welcomed the Wilson Ornithological Club to Ann Arbor and the Museum on the occasion of its Twenty-fourth Annual Meeting. President Margaret M. Nice responded to his gracious remarks.

The remainder of the Friday morning session and the sessions on Friday afternoon and Saturday were devoted to the reading of papers. Two were read by title in the absence of the speakers.

The program sessions were distinguished by two groups of papers. The first group of two papers appropriately recognized the Fiftieth Anniversary of the Wilson Ornithological Club. Dr. R. M. Strong, a Founder of the Club, traced the history of the organization to the present time. Having been witness of the Club's development from the date of its beginning, December 3, 1888, his paper contained numerous personal anecdotes that were no less interesting than entertaining. The Secretary, having studied the returns of the recent questionnaires to members, gave

a survey of the present organization. The second group of papers, four in number, composed a Symposium on the Ninth International Ornithological Congress at Rouen, France, May 9–13, 1938. Four Club members (Dr. Emil Witschi, Dr. G. M. Sutton, Mrs. Margaret M. Nice, and Dr. L. E. Hicks), who attended the Congress, described some of the high spots of the occasion.

A large portion of the papers presented were based on life history studies. Several other papers discussed conservation problems of current importance. Outstanding in popular interest were five papers illustrated by natural color motion pictures.

Below is given the program of papers together with brief abstracts:

OPENING SESSION, FRIDAY MORNING

1. Biological Research at the Edwin S. George Reserve. (12 minutes.)
JOSSELYN VAN TYNE, *Museum of Zoology, University of Michigan, Ann Arbor, Michigan.*

The Edwin S. George Reserve is a 1200-acre wildlife reserve of the University of Michigan Museum of Zoology, located 23 miles northwest of Ann Arbor. Here the staff of the Museum, students, and visiting scientists have opportunity to conduct investigations on a tract of land relatively undisturbed by surrounding centers of population.

2. Another Year with Nesting Prothonotary Warblers. Illustrated by lantern slides. (15 minutes.) LAWRENCE H. WALKINSHAW, *Battle Creek, Michigan.*

The data presented in this paper are outlined below:

I. Field methods and time spent in study.

II. Comparison of 1938 with 1937 season on the same two miles of river.
Date of arrival; Date of first nest, first egg; Success of nests; Second broods; Departure.

III. Returns and banding.

3. Some Birds of the Canadian Zone in the Great Smoky Mountains. Illustrated by lantern slides. (20 minutes.) ALBERT F. GANIER, *Nashville, Tennessee.*

4. A Study of Nesting Bluebirds. (15 minutes.) AMELIA R. LASKEY, *Nashville, Tennessee.*

A summary of nesting data of Bluebirds in 37 boxes placed in Percy Warner Park, Nashville, Tennessee, for the three nesting periods of the 1938 season with a brief mention of the results from the 26 and 27 boxes in the same park in 1936 and 1937, respectively.

From February 23, 1938, until mid-August, 45 trips were made to examine boxes, record data, band nestlings and brooding females, and to recapture brooding birds in each nesting period.

Thirty-six boxes were occupied at least once; 104 sets, consisting of 460 eggs, were laid by Bluebirds. There was one Crested Flycatcher nest and one Carolina Wren nest, both successful, and several attempts by House Sparrows.

5. Longevity of the Oven-bird. Illustrated by lantern slides. (10 minutes.) H. W. HANN, *Zoology Department, University of Michigan, Ann Arbor, Michigan.*

The report was based on the returns of thirty-six adult Oven-birds, twenty males and sixteen females, which were banded with metal and colored bands during the years 1933–1936.

The average return of the adult population during 1934–1938 was 51.7 per cent for the second year, 26.7 per cent for the third year and 11.4 per cent for the fourth year. Three males at least four years old and one at least three years old were present in 1938.

The average length of life of adults based on survival rate is 2.57 years, and is a little greater in males than in females.

The survival rate of 51.7 per cent for the second year appears to hold good for all ages of adult birds except perhaps those of four or more years.

6. Territorial Behavior of the Eastern Chipping Sparrow. (15 minutes.) RICHARD L. WEAVER, *Dartmouth College, Hanover, New Hampshire.*

A discussion of three summers' research at Cornell University in which 350 birds were marked with bands and feathers and followed through several nestings each summer. Family and individual records were kept. Extent of territory and factors involved, including "territorial fights," are described.

A Recognition of the Fiftieth Anniversary of the Wilson Ornithological Club

7. A Brief History of the Wilson Ornithological Club. (15 minutes.) R. M. STRONG, *Loyola University School of Medicine, Chicago, Illinois.*
8. The Wilson Ornithological Club of Today. A Study of the Present Organization Based on the Recent Questionnaire to Members. OLIN SEWALL PETTINGILL, JR., *Carleton College, Northfield, Minnesota.*

FRIDAY AFTERNOON

A SYMPOSIUM ON THE NINTH INTERNATIONAL ORNITHOLOGICAL CONGRESS AT ROUEN, FRANCE, MAY 9–13, 1938

Introduction by MARGARET M. NICE, *Chicago, Illinois.*

9. The Scientific Program. Illustrated by lantern slides. (15 minutes.) EMIL WITSCHI, *The State University of Iowa, Iowa City, Iowa.*
10. The Art Exhibit. (10 minutes.) GEORGE MIKSCH SUTTON, *Laboratory of Ornithology, Cornell University, Ithaca, New York.*
11. A Month's Study at Altenberg, Austria. MARGARET M. NICE, Chicago, Illinois. (15 minutes.)
12. Observations on European Birds. (10 minutes.) LAWRENCE E. HICKS, *Ohio State University, Columbus, Ohio.*
13. More Wildlife Sanctuaries in the National Park System. (15 minutes.) MRS. C. N. EDGE, *New York, New York.*

    A discussion of two recent policies of the Department of the Interior with special reference to the opportunity offered for the protection of wild life, both birds and mammals. These two policies as defined by the Secretary of the Interior are:

    "Part of the duty of our government is to save the finest forests that are still left in America, of this centuries-old primeval growth. The way to save them is to turn such forests into national parks. Judging from the rate at which forests are being cut, it is probable that in a hundred years the only important remnants of the virgin forest to be found anywhere in the country will be in national parks.

    "It is also a duty of the government, and one of its most important duties, to preserve and manage forests for commercial use, to protect the headwaters of streams, and to reforest the lands that are more valuable for trees than for agriculture. The way to do this is by maintaining national forests. Trees in these forests, if not needed to prevent erosion, will be cut, and will grow again, but will never reach the magnificent size of the trees in the primeval forests."
14. Some Toronto Bird Cycles. Illustrated by lantern slides. (15 minutes.) J. MURRAY SPEIRS, *University of Illinois, Champaign, Illinois.*

    Some of the species of birds that have wintered in the Toronto region have fluctuated markedly in numbers from year to year. The peaks of abundance of the American Rough-legged Hawk, the Snowy Owl, and the Northern Shrike have usually occurred at intervals of three to five years; peaks of the Pine Grosbeak have occurred at intervals of five or six years; and peaks of the Goshawk and Horned Owl have occurred at intervals of nine to eleven years.
15. Growth and Development of Young Wood Thrushes. Illustrated by lantern slides. (15 minutes.) FLORENCE B. WEAVER, *Hanover, New Hampshire.*

    Summaries of growth as evidenced by tabulation of measurements taken over a period of three summers at Cornell University. Graphs and charts were used to illustrate rate of growth, while photographs portrayed the feather development and size increases.
16. Illinois Crow Roosts. Illustrated by lantern slides. (20 minutes.) C. THEODORE BLACK, *University of Illinois, Champaign, Illinois.*

    A wintering population in excess of 1,000,000 Crows was present in Illinois in the winter of 1937-38, an average density of about twenty birds per square mile. These birds gathered nightly in over 100 roosts, located typically in upland natural groves, osage orange hedgerows, or low bottomland timber of large rivers, but occasionally in orchards and other artificial plantations, such

as evergreens or catalpas. Each roost has a well-defined feeding area, usually of fifteen or twenty miles radius. Largest and densest aggregations are formed during periods of low temperatures and incipient or actual precipitation. Moderate temperatures and fair weather produce scattered and even ground roosting, and when acompanied by moonlight, produce restless behavior on the roost. Sex and age ratios obtained from central Illinois roosts, January 11 to March 3, 1938, indicate an influx of adult females early in February, followed by a steady increase in the proportion of immature birds through that month. The ratio of adults to immature birds in central Illinois in winter is 3:1.

17. Factors Influencing the Growth of Young Turkey Vultures. Illustrated by lantern slides. (Read by Title.) VICTOR COLES, *Cincinnati, Ohio.*

SATURDAY MORNING

18. The Dispersal of 40,000 Banded Starlings. (20 minutes). LAWRENCE E. HICKS, *Ohio State University, Columbus, Ohio.*

From January 1, 1920 to July 1, 1937, 81,000 European Starlings were banded in the United States. More than 700 of these have been recovered in states other than where banded at distances of 100 to 1000 miles. Of these, 43,000 were banded in Ohio. Of 56,000 Starlings captured by the writer in central Ohio, 34,000 were banded. Of these, 31.6 per cent were eventually retaken after banding, 68.4 per cent were never heard from again. Of the birds banded, 14.9 per cent were taken as repeats 1 to 3 months after banding; 14.0 per cent were taken as returns 1 to 7 years after banding and 2.7 per cent were heard from as recoveries mostly in Ontario, New York, Quebec and Pennsylvania. Fifteen maps and graphs indicated the dispersal of these Starlings. Of the recoveries, 49.7 per cent were during the four winter months, 37.5 per cent during the four breeding months, and only 12.8 per cent during the four months of fall migration.

19. A Short History of the Great Lakes Ornithological Club. (15 minutes.) J. H. FLEMING. *Toronto, Canada.*

About the year 1900 a group of six persons W. E. Saunders, P. A. Taverner, B. H. Swales, A. B. Klugh, J. S. Wallace, and J. H. Fleming formed the Great Lakes Ornithological Club. The membership of the Club was never added to. This Club published a unique kind of manuscript bulletin which proved a useful means of communication.

20. The Plovers Come Back. (10 minutes). FRED T. HALL, *Crawfordsville, Indiana.*

This is a vivid example of the results of true conservation. The Upland Plovers, once common birds in the prairie regions of Indiana, disappeared completely and were so diminished in numbers throughout the entire country that many ornithologists thought them doomed to extinction. After effective laws and a program of conservation education the ruthless killing was so greatly reduced that some species of birds have made remarkable comebacks. The Upland Plover was one of the quickest to return to native habitats and today it is reestablishing itself in many of its favorite spots.

21. Territorial Studies of the Eastern Goldfinch. (15 minutes). MARGARET DRUM, *University of Michigan Biological Station and Owatonna, Minnesota.*

A discussion of studies made at the University of Michigan Biological Station during the summers of 1937 and 1938. The following questions were considered: Do Goldfinches have territories with definite boundaries? When are these territories established? Are these territories defended from other members of the same species? How large are these territories? What activities take place within the boundaries of these territories?

22. Environmental and Internal Factors of Seasonal Sexuality. Illustrated by lantern slides. (15 minutes). G. M. RILEY, *The State University of Iowa, Iowa City, Iowa.*

An investigation has been made of factors which influence seasonal sexual activity in birds with special reference to the cycle of the House Sparrow. The development of the gonads and secondary sexual characters during the breeding season is found to be dependent upon a mechanism involving: (1) certain environmental factors of which lengthened daily light period appear

primarily important; (2) endocrine factors, such as the activity of the anterior pituitary and the sex hormones; and (3) responsiveness of the gonads to gonadotropic substances. The study permitted a comparison of the relative importance of the role these factors play in the cycle of the two sexes.

23. Breeding Greater Prairie Chicken in Southern Iowa, 1938. Illustrated by lantern slides. (15 minutes). GEORGE O. HENDRICKSON and MAURICE F. BAKER, *Department of Zoology and Entomology, Iowa State College, Ames, Iowa.*

In the summer of 1938 a nest with eggs, and later two broods of young of Greater Prairie Chicken were observed in Davis County, southern Iowa. The corner of the several sections of land occupied by the birds was approximately 75 per cent timothy, harvested for hay and seed, and lightly grazed blue grass, and 25 per cent corn and oats.

24. Development of Body Temperature Control in House Wrens. Illustrated by lantern slides. (15 minutes). S. CHARLES KENDEIGH, *Baldwin Bird Research Laboratory and University of Illinois, Champaign, Illinois.*

The rate of metabolism of nestling House Wrens of ages 0, 3, 6, 9, 12 and 15 days was measured at air temperatures of 105, 100, 95, 90, 80, and 70 degrees Fahrenheit and below by collecting the carbon dioxide output in a modified Haldane apparatus over a period of three hours in each experiment. Correlations are made between carbon dioxide output, body temperature, age, water loss, respiratory quotient, weight loss, activity, rate of heart beat, and muscle tremors. The development of temperature regulation is a gradual one, beginning soon after hatching and not reaching full perfection until after the autumn molt. A study of the steps involved and the correlation of the various physiological functions in this development permit a more intimate analysis of the mechanism for body temperature regulation and a better appreciation of the way birds become adjusted to their environment.

25. Observations and Experiments on Melanism in Birds. Illustrated by lantern slides. (15 minutes). NICHOLAS W. FUGO and EMIL WITSCHI, *The State University of Iowa, Iowa City, Iowa.*

During the progress of research on birds in their laboratory there has come to the authors' attention in the common House Sparrow and in several species of African weaver finches the occasional occurrence of melanistic individuals. In addition, they recently observed in the domestic fowl (New Hampshire Red) that removal of the pituitary primordia early in embryogenesis results in a characteristic melanism of the down. These cases have been investigated from an endocrine point of view in an attempt to explain the excessive melanization of the plumage, special attention being paid to the thyroids, parathyroids, sex glands and also to the basal metabolism.

26. Recording Heart Beat, Activity, and Respiration of Incubating Birds at the Nest. Illustrated by lantern slides. (15 minutes). EUGENE P. ODUM, *Baldwin Bird Research Laboratory and University of Illinois, Champaign, Illinois.*

Successful field use of a specially devised instrument for recording heart beat and other movements of birds was accomplished during the summer of 1938. The sensitive pickup crystal unit was placed under the nest and recording instruments operated from a blind. Analysis of records at two house wren and two catbird nests showed that heart rate during undisturbed rest varies from minute to minute or even second to second in a cyclic manner as previously observed in most species and individuals under laboratory conditions. The heart rate of the two species under various conditions of air temperature, activity, time of day and night was compared with standard rates obtained under controlled conditions. Data on respiratory movements, muscular movements and activity in general during incubation periods are also available from such recordings. The aim of these studies is to obtain information on the physiological-ecology of birds, *i.e.*, the ways in which birds function in nature.

27. Observations on the Distribution of Birds in Mountainous Parts of Utah. (15 minutes). C. LYNN HAYWARD, *Brigham Young University, Provo, Utah, and University of Illinois, Champaign, Illinois.*

The paper dealt with the habitat preferences of various species of mountain-dwelling birds as they have been observed in the principal mountain ranges

of Utah, with special reference to Mount Timpanogos of the Wasatch Range. Emphasis was placed on such physical factors as degree of ruggedness, exposure and snowslides as they effect vegetation and consequently bird distribution.

28. The Establishment and Maintenance of Territories by Yellow-headed Blackbirds. (15 minutes). REED W. FAUTIN, *University of Illinois, Champaign, Illinois.*

Two nesting colonies of Yellow-headed Blackbirds in the vicinity of Utah Lake near Provo, Utah, were kept under observation from the time the birds arrived in the spring until they departed in the autumn. Soon after he arrived each male was found to establish an individual territory in which several females would nest. The time of establishment, size, populations, and maintenance of individual territories were determined and observations made on the behavior of both males and females within and outside their territories.

29. Birds of the Oak Openings near Toledo, Ohio. (15 minutes). LOUIS W. CAMPBELL, *Toledo, Ohio.*

West of Toledo is a series of fossil post-glacial beaches which has attracted a great variety of nesting birds because of the great diversity of habitats found there. Within areas of one square mile can be found bogs, wet prairie, swamp forest, open oak woods, and sand dunes. Many northern and southern forms approach the limits of their breeding range at this point.

30. Incidence of Lead Poisoning in Minnesota Waterfowl. (10 minutes). GUSTAV SWANSON, *Division of Economic Zoology, University of Minnesota, St. Paul, Minnesota.*

The viscera of 353 waterfowl, representing 18 species, taken throughout Minnesota by duck hunters, were examined. Over 6 per cent contained one or more lead shot in their gizzards. In the case of the mallard, 7 per cent contained shot while for diving ducks the figure was 12 per cent. These figures strengthen the belief that next to the direct kill in hunting lead poisoning is probably the most important mortality factor which waterfowl face.

31. Waterfowl on Four Allegheny Lakes. (10 minutes). MAURICE BROOKS, *West Virginia University, Morgantown, West Virginia.*

This paper treated a study of waterfowl populations on four recently created artificial lakes in the central portion of the Allegheny mountains, in a region entirely without extensive natural bodies of water. Two of the lakes are in West Virginia, and two in western Maryland, the elevations ranging between 900 and 2600 feet. Since the region lies at the edge of the flyway between Lake Erie and Chesapeake Bay, there are often heavy flights of waterfowl, a five-year count having recorded something near 40,000 individuals in this mountain section.

Creation of these lakes has profoundly modified the waterfowl fauna of the region, five new species having been added locally to the West Virginia list, and twenty-six new species to the list for western Maryland. A notable feature is the occurrence of loons in flocks of one hundred or more. Species of special interest are Red-throated Loon, Holboell's Grebe, all three of the eastern Scoters, and Western, Baird's, and Stilt Sandpipers.

SATURDAY AFTERNOON

32. Hawk Protection Made Popular. (15 minutes). MRS. C. N. EDGE, *New York, New York.*

A description of the educational and conservation work being accomplished at Hawk Mountain, Pennsylvania. The favorable reaction of the general public to the Hawk Mountain undertaking is most encouraging and shows greater hope for the protection of predatory birds.

33. A Nest of the Black-throated Green Warbler. Illustrated by lantern slides. (15 minutes). FRANK A. PITELKA, *University of Michigan Biological Station and University of Illinois, Champaign, Illinois.*

A Black-throated Green Warbler's nest was studied near Douglas Lake in northern Michigan from early collection of nesting material to the departure of the young from the nest. Certain of the more interesting observations on

nesting habits and behavior with comments on songs and calls, and particularly those made during a full day's stay in the blind (young 5 days old), were given.

34. Tropical Bird Populations. Illustrated by lantern slides. (20 minutes). C. BROOKE WORTH, *Swarthmore College, Swarthmore, Pennsylvania.*

The author found fledgeling mortality at Chiriqui, Panama, to be as low as 20 per cent or even less. He also observed that Passerine birds laid only two eggs per clutch. The parent birds made no outcries when their nests were disturbed.

Birds in the jungle existed in a large variety of species but in small absolute numbers.

These facts, many of them corroborated by consultation with other workers in tropical ornithology, led the author to advance a number of theories as to the means of regulation of tropical bird populations. These theories, contrasted with known conditions of the Temperate Zone, led further to an attempt to delineate paths of radiation and dispersal of Passerine birds over North, Central, and South America during recent geological times. Numerous phases of the ecology of birds of the Temperate Zones were considered in the light of the foregoing dissertation.

35. Notes on the Social Organization Among Certain Colony Nesting Birds. Illustrated by lantern slides. (20 minutes). ROBERT A. JOHNSON, *State Normal School, Oneonta, New York.*

The paper dealt with the variations in the nature of the social life among the sea bird colonies of the Razor-billed Auk, Atlantic Murre, Atlantic Puffin, and Black Guillemot. Consideration is given to the relations among individual birds and to the different species patterns relative to the relation of their feeding grounds, play grounds, and nest spots.

36. Notes on the Distribution and Habits of the Sharp-tailed Grouse in Michigan. Illustrated by lantern slides and motion pictures. (25 minutes). FREDERICK M. BAUMGARTNER, *Department of Conservation, Lansing, Michigan.*

The status of the Prairie Sharp-tailed Grouse in Michigan has changed markedly since the species made its first appearance about 1920. The Sharptails apparently followed extensive burns into the west end of the Upper Peninsula from Wisconsin. After the first invasions into Gogebic and Ontonagon Counties these birds spread eastward rapidly and by 1934 had extended their range to the west end of the Escanaba River Tract. By 1938 the advancing front had reached Munising, Seney Marsh, and Manistique.

In order to encourage the Sharptail, which gives promise of becoming one of the outstanding game birds in Michigan, the Conservation Department has devoted considerable study to the habits and requirements of this species. These studies have considered the following subjects: dancing ground distribution and habits, nesting habits and brood requirements, food and cover preferences at all seasons of the year, hunting season distribution, winter distribution, diseases and parasites, trapping and banding for the purpose of determining winter movements, and the planting of wild trapped birds in new locations in order to hasten their natural dispersal.

37. The Relationship of Wildlife to Recent Developments in Agricultural Drainage and Mosquito Control. Illustrated by lantern slides. (15 minutes). GEORGE ANDREW AMMANN, *Bureau of Biological Survey, Milwaukee, Wisconsin.*

A short history of the incidents leading to the present procedure of reviews by the Biological Survey of drainage projects carried on under the W.P.A.; explanation and difficulties of the present procedure; the general types of drainage work disapproved by the Bureau for the good of wildlife.

38. A Proposed Great Plains National Monument. Illustrated by lantern slides. (20 minutes). VICTOR H. CAHALANE, *Wildlife Division National Park Service, Washington, D. C.*

The federal system of national monuments includes not only areas of historic and archeologic importance, but biological communities as well. Eventually, at least one example of each important vegetation type and habitat of each major vertebrate species should be preserved in the system. Among the

most conspicuous and important plant and animal associations of the entire United States is the grassland. After extensive field investigation by the National Park Service, the Ecological Society of America and the National Research Council, a suitable area has been located in southwestern South Dakota and adjacent Nebraska. Some 1,500,000 acres are involved, of which about 75 per cent are in public ownership. The vegetation has suffered severe abuse but, it is believed, would recover if protected from over-use. Much of the original avian fauna remains, the most important species are several waterfowl, raptores, prairie chicken and sharp-tail grouse, whooping crane, upland plover and numerous smaller forms. The larger mammals must be restored, as the bison, elk and deer were extirpated long ago. The local race of bighorn, however, is now extinct. Restoration of the larger predators presents difficult problems that must be worked out, together with management of the grazing mammals and plans for public use. If established, such a grassland area would serve as a refuge for several important species of birds as well as mammals, as a check against the effects of use of similar grassland under agricultural use, and as a unique exhibit of the western plains of the past era.

39. The W. K. Kellogg Bird Sanctuary in Color. Illustrated by natural color motion pictures. (25 minutes). MILES D. PIRNIE, *W. K. Kellogg Bird Sanctuary, Battle Creek, Michigan, and Michigan State College, East Lansing, Michigan.*
40. Natural Color in Muscongus Bay, Maine—Home of the Audubon Camp. Illustrated by natural color motion pictures. (15 minutes). JOHN H. BAKER, *National Association of Audubon Societies, New York, New York.*
41. Bird Portraits in Color. Illustrated by natural color motion pictures. (Read by title). KARL H. MASLOWSKI, *Ohio Division of Conservation, Columbus, Ohio.*
42. Minnesota Birds in Color and the Story of the Blue Goose. Illustrated by natural color motion pictures. (30 minutes). WALTER J. BRECKENRIDGE, *Museum of Natural History, University of Minnesota, Minneapolis, Minnesota.*

THE ANNUAL DINNER

One hundred and twelve members and visitors attended the Annual Dinner of the Wilson Ornithological Club in the Michigan Union on Saturday evening. An attractive menu bore on its cover a drawing of the Long-eared Owl by George Miksch Sutton. This drawing was the one recently chosen by the Library Committee as the official book-plate of the Wilson Club Library.

Directly following the dinner, members and visitors moved to another room in the Union. Dr. George Miksch Sutton gave a fascinating story of "Bird Hunting in Mexico,"—a vivid résumé of recent field work done in that country by the J. B. Semple-Carnegie Museum Expedition. To illustrate his account Dr. Sutton passed among the audience many of his remarkable water-color field sketches. Some of them showed birds never before portrayed. The Secretary presented his latest natural color motion pictures entitled "Adventures with Birds." His film depicted numerous episodes in the life histories of such common birds as the Bluebird, Black-billed Cuckoo, House Wren, Black Tern, and Goldfinch.

EXHIBIT OF LIFE HISTORY MONOGRAPHS

Near the Registration Desk was a display of American bird life history monographs. While it was not the plan of this exhibit to present a complete collection of such monographs, it was sufficiently comprehensive to show the great progress made in this phase of Ornithology.

THE WILSON CLUB LIBRARY

Members availed themselves of the opportunity of inspecting and using the Club's library located in the Bird Division of the Museum of Zoology.

THE ORNITHOLOGICAL ART EXHIBIT

During the meeting an Ornithological Art Exhibit was held jointly by the Wilson Ornithological Club and the Ann Arbor Art Association in the new Rack-

ham Building. The following twenty-two artists were represented by at least one work:

Frank Benson
Courtenay Brandreth
Paul Bransom
W. J. Breckenridge
Allan Brooks
Carl Burger
Edward von Siebold Dingle
Louis Agassiz Fuertes
Fred T. Hall
Albert Hochbaum
R. Bruce Horsfall
Lynn Bogue Hunt
Francis L. Jaques
William Montagna
Arthur Nelles
Ralph S. Palmer
Egbert W. Pfeiffer
S. Morris Pell
Roger T. Peterson
Karl Plath
Earle L. Poole
George Miksch Sutton

One outstanding feature of the exhibit was a group of twenty-two etchings by Frank Benson, loaned for the occasion by Mrs. William A. Comstock of Ann Arbor. One hundred and sixteen pictures were hung in the exhibit.

On Friday evening members and guests enjoyed an informal reception in the rooms adjoining the Art Exhibit. An excellent opportunity was provided for visiting members to meet the Wilson Club's large number of Ann Arbor members. Just before the reception Dr. George Miksch Sutton gave a short gallery talk in which he traced the development of ornithological art up to the present time. This event provided a most appropriate background for appreciating the works of art on display.

Attendance

Altogether 261 persons registered at the Ann Arbor Meeting. This attendance figure is the largest in the history of the organization, exceeding even the Indianapolis meeting of last year when 238 were present.

A careful examination of the registration books shows that the persons in attendance consists of one Founder, 111 members, and 149 visitors. Twenty states, the District of Columbia, and the Dominion of Canada, were represented. The Michigan contingent was notably large with 45 members and 109 visitors on hand. Future meetings will have difficulty in breaking the great record of local attendance. Next to Michigan, the state with the largest representation was Ohio, with 14 members and 13 visitors.

The list of members in attendance follows:

From **Alabama:** 1—Fred S. Barkalow, Jr., Auburn. *Visitor,* 1.

From **California:** 1—Mrs. H. J. Taylor, Berkeley.

From **Illinois:** 10—Mrs. M. M. Nice, Mrs. W. D. Richardson, Mrs. A. S. Park, R. M. Strong. Miss Amy G. Baldwin, L. B. Nice, Chicago; C. T. Black, E. P. Odum, Frank A. Pitelka, S. C. Kendeigh, Champaign. *Visitors,* 3.

From **Indiana:** 6—Miss M. R. Knox, Miss M. F. Campbell, Miss Elizabeth Mullin, Indianapolis; F. B. Ebersole, Fort Wayne; F. T. Hall, Crawfordsville; S. W. Witmer, Goshen. *Visitors,* 3.

From **Iowa:** 8—Emil Witschi, N. W. Fugo, G. M. Riley, P. L. Risley, Iowa City; B. C. Buchanan, T. C. Stephens, Sioux City; G. O. Hendrickson, T. G. Scott, Ames.

From **Kansas:** *Visitors,* 4.

From **Kentucky:** 1—B. L. Monroe, Louisville.

From **Michigan:** 45—R. E. Morrill, W. H. Burt, Josselyn Van Tyne, H. W. Hann, N. A. Wood, Mrs. R. L. Kahn, M. B. Trautman, Pierce Brodkorb, A. E. Staebler, D. P. Duncan, M. M. Peet, B. J. Bujak, T. D. Hinshaw, R. W. Allen, A. D. Tinker, D. C. Kahn, M. S. Anning, Ann Arbor; L. H. Walkinshaw, M. D. Pirnie, E. M. Brigham, Jr., Battle Creek; Miss M. E. Gross, H. L. Creswell, Grand Rapids; F. C. Huggett, Bellevue; F. J. Hinds, Miss Theodosia Hadley, L. C. Kuitert, Miss La Verne Argabright, Kalamazoo; Mrs. Oliver Kamm, Grosse Pointe Farms; W. G. Fargo, Jackson; M. T. Sturgeon, Ypsilanti; C. C. Ludwig, R. D.

Burroughs, F. F. Tubbs, Lansing; B. M. Jessman, D. B. Hillmer, Alexander Blain, Detroit; J. W. Stack, F. M. Baumgartner, L. C. Hulbert, Miss M. E. Pyke, East Lansing; B. A. Barber, Hillsdale; R. E. Olsen, Pontiac; D. L. Allen, Allegan. *Visitors,* 109.

From **Minnesota:** 6—W. J. Breckenridge, Minneapolis; G. N. Rysgaard, Gustav Swanson, St. Paul; Miss Margaret Drum, Owatonna; O. S. Pettingill, Jr., Northfield; Mrs. C. E. Peterson, Madison. *Visitors,* 5.

From **New Hampshire:** 1—R. L. Weaver, Hanover. *Visitor,* 1.

From **New York:** 5—G. M. Sutton, Ithaca; Miss Theodora Nelson, J. H. Baker, Mrs. C. N. Edge, New York City; R. A. Johnson, Oneonta. *Visitor,* 1.

From **North Carolina:** *Visitor,* 1.

From **Ohio:** 14—D. T. Katz, L. E. Hicks, E. J. Thomas, Columbus; J. T. Stophlet, L. W. Campbell, L. D. Hiett, J. M. Shepherst, Toledo; Miss M. E. Morse, Miss Vera Carrothers, H. G. Smith, Cleveland; T. W. Porter, Oak Harbor; E. L. Moseley, Bowling Green; H. T. Gier, Athens; E. A. Seaman, Wooster. *Visitors,* 13.

From **Oregon:** *Visitor,* 1.

From **Pennsylvania:** 1—C. B. Worth, Swarthmore. *Visitor,* 1.

From **South Carolina:** *Visitor,* 1.

From **Tennessee:** 2—A. F. Ganier, Mrs. A. R. Laskey, Nashville.

From **Utah:** 2—C. L. Hayward, R. W. Fautin, Provo.

From **Washington, D.C.:** 1—V. H. Cahalane.

From **Wisconsin:** 2—H. C. Wilson, Ephraim; G. A. Ammann, Milwaukee. *Visitors,* 4.

From **West Virginia:** 3—Maurice Brooks, I. B. Boggs, Morgantown; W. A. Lunk, Fairmont; *Visitor,* 1.

From **Dominion of Canada:** 3—J. H. Fleming, Mrs. D. H. Mills, J. M. Speirs, Toronto, Ontario.

Summary of Attendance: Total registration, 261 (Members, 112; Visitors, 149); Total from Ann Arbor, 63 (Members, 17; Visitors, 46); Total from Michigan, 154. (Members, 45; Visitors, 109). Total outside of Michigan, 107. (Members, 68; Visitors, 39). Maximum number at each progam session: Friday morning, 85; Friday afternoon, 125; Saturday morning, 105; Saturday afternoon, 260. Number at Annual Dinner, 112. Number of persons in group photograph, 131.

REPORT OF THE LIBRARIAN FOR THE YEAR ENDING OCTOBER, 1938

I have the honor to present herewith the eighth annual report of the Librarian of the Wilson Ornithological Club.

Again this year as in the past I have availed myself of the help offered by the Works Progress Administration and made further improvement of the library. With the aid of a capable assistant I have been able to make a complete list of all the books, pamphlets, and cards showing the holdings we have of all periodicals.

A shipment of periodicals from the editor of *The Wilson Bulletin,* Dr. T. C. Stephens, was received in August of this year. The editor obtained these by exchange with other bird societies or academies of natural science. Many of these periodicals were new titles in the library while others filled in sets that were incomplete. The volumes that were complete were bound while the unbound numbers have been placed in suitable boxes and put on the shelves in their places.

In addition to the large shipment of periodicals from the present editor, another large group came from the former editor, Dr. Lynds Jones. Of this latter group many were *Wilson Bulletins* which were added to the stock on hand. There were, however, some new titles which were added to the Wilson Club Library. These titles will be found in the catalogue of the library.

The library has continued to receive as exchanges directly from academies and societies the following publications: *Natural History, Bird-Lore, Archives Suisses d'Ornithologie* and *Proceedings of the Iowa Academy of Science.*

We have received a large number of gifts this past year. Besides the gift from Dr. Lynds Jones, we have received a number of pamphlets and books from W. L. Willis of New York City, Ralph Beebe of Ecorse, Michigan, O. A. Stevens of Fargo, North Dakota, and Paul L. Errington of Ames, Iowa. Others that have contributed to the library are Miss Marcia B. Clay of Bristolville, Ohio, Mr. B. W. Cartwright of Winnipeg, Canada and Dr. Harry Hann of Ann Arbor, Michigan. Two hundred and seventy nine unbound pieces and eleven bound books were received during the year. All of these have been recorded and placed in their places on the shelves of the library.

Respectfully submitted,
October 8, 1938 F. RIDLEN HARRELL, *Librarian.*

REPORT OF THE ENDOWMENT FUND COMMITTEE OF THE WILSON ORNITHOLOGICAL CLUB

The Endowment Fund Committee of the Wilson Ornithological Club was appointed by the President in March, 1938 with the purpose of advising the Wilson Ornithological Club as to the accumulation and proper care of an Endowment Fund. That committee made report after it was appointed, relative to its decision in connection with the investments of funds in the Endowment Fund. The Endowment Fund Committee authorized the investment of $806.25 from the funds in the Endowment Fund account to be expended for United States Postal Savings Bonds. Said investment was consummated as set out in the report of the Treasurer.

Respectfully submitted,
MRS. H. J. TAYLOR
THEODORA NELSON
Nov. 22, 1938 SAMUEL E. PERKINS III, *Chairman*

REPORT OF THE WILDLIFE CONSERVATION COMMITTEE

I hope you agree with our President that there is a service which this kind of committee can and should be doing, not only for our members and for wildlife itself, but also to aid in worthwhile Conservation effort in all the states. We do not wish it said of this Club that in our zeal for studying and enjoying wildlife we fail to serve it.

With its members scattered from Denver to New York and from Minnesota to Mississippi, a meeting of your committee has been out of the question prior to this meeting, and now only two of the eight have met together. By correspondence, however, I have gathered several very worthwhile suggestions, and I invite your serious consideration of these suggestions, which follow:

A. That the *Club*
   1. Devote at least a few pages of *The Wilson Bulletin* to wildlife conservation communications, news items, requests for data, etc.
   2. Plan wildlife conservation symposia of one or two hours for the Annual Meetings.

B. That the *Committee on Wildlife Conservation*
   1. Inventory wildlife needs in the various states.
   2. Offer aids to legislative committees and to state and national agencies dealing with wild bird problems.
   3. Consider plans for educational campaigns, first among our members, and, later perhaps, with the public.

C. That *Each Member*
   1. Take more interest in wildlife affairs in general and be alert for chances to cooperate with *deserving* conservation efforts.
   2. Report wildlife emergencies to your President and Chairman.

3. Send to the Editor of *The Wilson Bulletin* news items on protection needs, local abuses, and other wild bird problems.

Most wildlife conservation leaders, whether local, state, or national, tend to become biased and one-track. Few are aware of the scope and intricacy of wildlife relations—or the so-called ecological factors. As yet wildlife objectives have not been agreed upon and real progress is slowed down by the lack of stated objectives.

We, as a group, should try to come to some agreement as to what we wish to do, or your Wildlife Conservation Committee will accomplish little more than a waste of some postage, stationery, and time. (I am not too confident we can agree, however, either as to how many hawks or ducks there were once, are now, or should exist in the future). Certainly we should be able to devote some time and well-directed energy in keeping alert for the welfare of the birds. This, we believe, is the primary function of this committee.

Respectfully submitted,
MILES D. PIRINE, *Chairman*

REPORT OF THE COMMITTEE ON AN INDEX OF THE WILSON CLUB PUBLICATIONS

A committee was appointed by President Nice, soon after the December 1937 meetings, consisting of the following members: Thomas D. Hinshaw, Edwin A. Kalmbach, Phoebe Knappen, Charles C. Sperry, and R. M. Strong, chairman. There has been some correspondence with the members of the committee. Considerable progress has been made by Mr. Hinshaw, who had begun work on the index before the appointment of the committee. At the time of the meeting in Ann Arbor, he had accumulated the following numbers of entries for the year 1889 to 1933, each entry on a separate card: author-titles, 3100; literature reviews, 1000; miscellaneous topics, 300; names of species, 2400.

A policy was discussed by Mr. Hinshaw and the chairman at the Ann Arbor meeting, which involves features of the last *Auk* ten-year index, the last *Condor* ten-year index and the scheme adopted for the preparation of an index for the *Journal of Mammalogy*. The committee hopes to push the completion of the work rapidly. This will involve cooperation by several persons who will undertake to cover certain volumes, especially for topic and species entries.

The index will be made as complete as is financially feasible. No plan for financing its publication has been adopted as yet, but it will be necessary, apparently, to find some way of underwriting the cost. At the Ann Arbor meeting Mrs. H. J. Taylor, of Berkeley, California, generously offered to make a contribution to such a fund.

Respectfully submitted,
R. M. STRONG, *Chairman*

THE REPORT OF THE SECRETARY FOR 1938[1]

Last year the Executive Council agreed to send the program of this Annual Meeting to each member a week or ten days in advance. The Secretary has carried out its wishes. Thus, every member, regardless of where he may live, has in his hands at this time a copy of the program now being distributed from the Registration Desk. This innovation should be most worthwhile. To members who do not customarily attend these meetings, it should make them more aware of the fact that we hold Annual Meetings; it might be sufficiently attractive to encourage them to attend either this or future meetings. Members who plan to attend this meeting and take part in the program, should be helped in making their plans and in knowing when and where certain events will take place.

All of the members of the Michigan Audubon Society received by mail programs and individual invitations to be present at this meeting.

[1] Revised through December 31, 1938.

The arrangement of the program has been intrusted to a newly appointed Program Committee. This committee would appreciate any suggestions for the improvement of future meetings or any comments on the present program.

Much of the Secretary's time has been taken up with the work of membership solicitation. Over 3000 letters inviting individuals to join the Club have been sent out by his office. The Secretary has been aided in this work by the President, who has herself sent out several hundred letters.

The Secretary is not satisfied with the present system of membership solicitation. His reasons are three-fold: (1) It does not seem fair for the Secretary, or for the other officers of the organization, to bear the brunt of membership solicitation, when there are necessarily other official duties that occupy their time. He feels that other members who enjoy *The Wilson Bulletin*, the Annual Meetings, and other Club activities should share in support of the organization. (2) It is not humanly possible for one individual to be in contact with enough prospective members. To be sure, each year members are requested to return nomination blanks filled out with the names of candidates for membership, but it is well known to persons, aware of the workings of organizations in general, that the results of requests for nominations are never satisfactory. This year, as last, no more than 150 names have been submitted to the Secretary. The Secretary has, therefore, resorted to the use of membership rolls of other natural history organizations, but naturally the percentage of return has been low, for generally persons already belonging to organizations of a similar nature do not feel it financially possible to join others. To receive substantial returns, it has been necessary to send out a large number of letters. The letters have not been personal because the number has been too great. (3) The present method of sending out quantities of mimeographed letters with enclosed printed matter seems to the Secretary much too commercialized and unethical in an organization of this sort. It makes the Wilson Ornithological Club appear as a subscription list rather than an organization in which the members are nominated and elected.

The Secretary proposes the appointment of a strong membership committee with the following organization. There should be a chairman from each state. It should be the duty of each state chairman to appoint a committee to gather together the names of all personal acquaintances in the state interested in birds and to locate all local natural history organizations and obtain the membership lists. The names of persons gathered should be submitted to a general chairman of the committee. It should be the duty of the general chairman and his committee to forward personal letters and invitations to the names submitted. The general chairman should be provided by the Club with stationery, postage, and secretarial help. The Secretary proposes a second recommendation, namely, the preparation of the above-mentioned personal letters in the following fashion: each personal letter should be brief; it should invite the prospective candidate to join the organization and should present the candidate with two pieces of enclosed printed matter: (1) an attractively printed folder containing the historical background, objectives, and activities of the Club; (2) an application card.

Until such Membership Committee is firmly established, the Secretary is willing to continue his present solicitation duties. He realizes, as all of you realize, that without membership solicitation and the obtaining of a new group of members each year the Club will drop radically in numbers.

The need of better membership solicitation can be shown in the present status of our roll. During 1938 we have lost 127 members: 85 were delinquent in dues; 32 resigned; 10 were taken by death. We have obtained 160 new members giving us a total of 871. We have thus received a net gain over last year of just 33 members!

There is no reason why a greater gain in membership cannot be made. With a progressive Membership Committee the size of the Wilson Ornithological Club

should be increased to several hundred more members in one year. At this meeting the Secretary asks for volunteers for this all-important work.

Our membership continues to be distributed principally in the midwestern states, with Ohio containing the greatest numbers of members, 94 in all, with Michigan following second with 79, and with Illinois, New York, California, and Iowa following close thirds.

The total distribution of members by states, provinces, and foreign countries is given below. The figures in parentheses indicate the number of members *new* to the organization in 1938.

UNITED STATES		
Alabama	1	
Arizona	5	
Arkansas	5	(1)
California	47	(5)
North Carolina	4	
South Carolina	2	(1)
Colorado	9	
Connecticut	5	
North Dakota	8	(1)
South Dakota	6	(1)
Delaware	2	(1)
Florida	6	(2)
Georgia	11	
Idaho	5	(2)
Illinois	73	(22)
Indiana	23	(5)
Iowa	43	(6)
Kansas	3	
Kentucky	16	(2)
Louisiana	5	
Maine	5	
Maryland	8	
Massachusetts	26	(1)
Michigan	78	(30)
Minnesota	29	(8)
Mississippi	6	(1)
Missouri	21	(3)
Montana	2	
Nebraska	11	(1)
Nevada	1	
New Hampshire	3	
New Jersey	12	(5)
New Mexico	6	(1)
New York	59	(12)
Ohio	94	(17)
Oklahoma	13	(7)
Oregon	5	(1)
Pennsylvania	39	(5)
Rhode Island	1	
Tennessee	21	(2)
Texas	18	(3)
Utah	7	(2)
Virginia	13	
West Virginia	11	(2)
Vermont	1	
Washington	7	
Washington, D.C.	26	(1)
Wisconsin	26	(4)
Wyoming	5	(1)
CANADA		
British Columbia	5	
Manitoba	3	
Ontario	18	(3)
Quebec	3	
Saskatchewan	2	(1)
FOREIGN COUNTRIES		
Cuba	1	
Finland	1	
Holland	1	
Italy	1	
New Zealand	1	
Virgin Islands	1	
South America	1	

The 160 new members are classified as follows: Sustaining, 5; Active, 38; Associate, 117. The total membership is classified as follows: Honorary, 4; Life, 9; Sustaining, 37; Active, 215; Associate 606.

Respectfully submitted,
OLIN SEWALL PETTINGILL, JR., *Secretary*

November 25, 1938

REPORT OF THE TREASURER FOR THE YEAR 1938

Receipts for 1938

Balance as shown by last report dated Dec. 24, 1937		$ 395.34
Dues:		
Associate		777.85
Active		501.76
Sustaining		168.50
Subscriptions to *"Wilson Bulletin"*		103.12
Sale of back numbers of *"Wilson Bulletin"*		16.22
Contribution toward Publication		40.00
Miscellaneous receipts		14.80
Total		$2,017.59

Disbursements for 1938

President's expense, postage	$ 13.57	
Annual Meeting expense (1937)	213.09	
Membership, Ecological Society of America	1.00	
Book plate	3.28	
Secretary's expense, postage, supplies, secretarial aid, printing	170.56	
Editor's expense, postage, supplies, bulletin	1,342.12	
Treasurer's expense, postage, printing, secretarial aid	74.71	
Subscription refunds	5.85	
Miscellaneous bank charges	5.77	1,829.95
Balance on hand in Fletcher Trust Co., Nov. 23, 1938		$ 187.64

Endowment Fund

Total Endowment Fund shown by report dated December 24, 1937:		
Bonds in safety deposit box of Fletcher Trust Co., at Indianapolis in the sum of	$1,455.00	
Balance cash in savings account, Fletcher Trust Company at Indianapolis in the sum of		$ 888.65
Received during the year:		
Interest coupons on U. S. Postal Savings 2½% Coupon Bonds due January 1, 1938 and July 1, 1938 and deposited in savings account		19.50
Interest received on amount on deposit in Fletcher Trust Co., Indianapolis, payable May 1, 1938 and Nov. 1, 1938		7.13
		$ 915.28

Bonds purchased during the year:

Registered U. S. Savings Bonds purchased with funds in savings account on deposit in Fletcher Trust Co., Indianapolis, as follows:

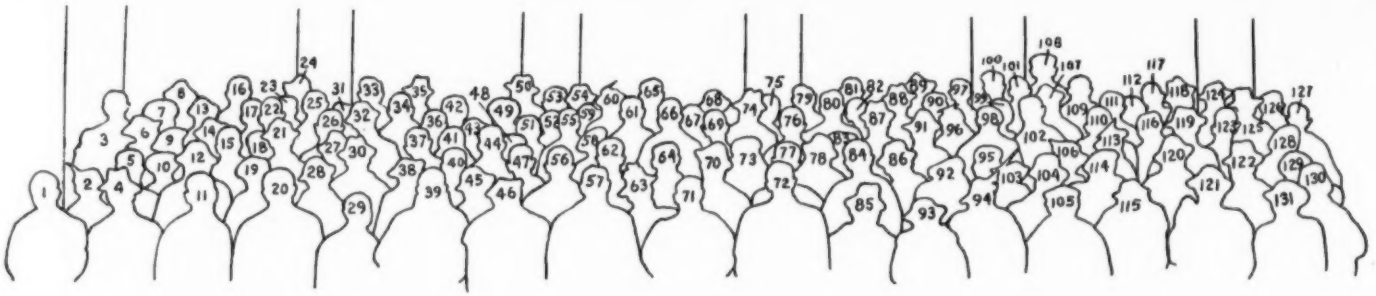
1—$ 25.00	paid $ 18.75	
1— 50.00	paid 37.50	
1— 1,000.00	paid 750.00	
Total value date of maturity	1,075.00	
Total cost August 18, 1938	806.25	806.25

Total Endowment Fund as shown herewith this 22nd day of November, 1938:		
Bonds in safety deposit box of Fletcher Trust Co., at Indianapolis in the sum of	$2,261.25	
Balance cash in savings account, Fletcher Trust Co., at Indianapolis in the sum of		$ 109.03
Grand total of Endowment Fund November 22nd, 1938		$2,370.28

Respectfully submitted,

Nov. 22, 1938 SAMUEL E. PERKINS III, *Treasurer*

Group at the Annual Meeting, Ann Arbor, November 26, 1938



KEY TO THE W. O. C. GROUP PHOTOGRAPH AT ANN ARBOR, 1938

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51, Mrs. Gustav Swanson. 52, Margarette E. Morse. 53, Howard A. Jones. 54, G. A. Ammann. 55, Robert L. Patterson. 56, E. S. Thomas. 57, R. M. Strong. 58, ———. 59, Mrs. Marion S. Anning. 60, ———. 61, John L. George. 62, B. C. Buchanan. 63, Mrs. E. S. Thomas. 64, N. A. Wood. 65, Walter P. Nickell. 66, H. G. Smith. 67, Vera Carrothers. 68, Bert Lambert. 69, ———. 70, E. P. Odum. 71, T. C. Stephens. 72, G. M. Sutton. 73, Mrs. Doris H. Mills. 74, ———. 75, L. H. Walkinshaw. 76, ———. 77, R. W. Fautin. 78, C. T. Black. 79, W. J. Breckenridge. 80, E. T. Boardman. 81, H. W. Hann. 82, Homer L. Bradley. 83, Margaret E. Gross. 84, C. B. Worth. 85, H. L. Creswell. 86, T. W. Porter. 87, J. H. Baker. 88, E. L. Moseley. 89, L. Claire Hulbert. 90, Mary Pyke. 91, M. M. Peet. 92, Elizabeth Mullin. 93, Mildred F. Campbell. 94, Theodora Nelson. 95, Mrs. F. F. Tubbs. 96, Mrs. Florence B. Weaver. 97, Paul H. Barrett. 98, J. M. Spiers. 99, Wilma R. Stark. 100, G. N. Rysgaard.

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1921—Chicago	December 26-27	R. M. Strong
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1928—Ann Arbor	Nov. 30-Dec. 1	Lynds Jones
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